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Return to Neverland 4

For director Steven Spielberg, *Hook* fulfilled a seven-year recurring dream to bring the classic story of *Peter Pan* to the screen for modern audiences. Accompanying the eternal boy — now a grown-up attorney who has lost touch with his youth — back to Neverland were Spielberg regulars including physical effects provider Michael Lantieri and the visual effects artists of Industrial Light and Magic. Surrounded by an army of designers and technicians, Spielberg mounted a \$70 million epic destined to be remembered as the most lavish studio production in recent history. *Article by Mark Cotta Vaz.*

Borrowed Flesh 24

As a youth in his native Toronto, David Cronenberg devoured with relish the iconoclastic prose of beat generation author William S. Burroughs. Thirty years later, he was to write and direct a screen adaptation of Burroughs' most celebrated novel, *Naked Lunch*. Having populated his bizarre script with a variety of never-before-seen creatures — from emaciated mugwumps to talking insect-typewriters — Cronenberg engaged the effects artisans of Chris Walas Incorporated to breathe life into some of his film's most important characters. *Article by Jody Duncan.*

Letting Slip the Dogs of War 40

A cataclysmic disaster prompts an unprecedented offering of peace from the Klingon empire. Thematically and time-wise, *Star Trek VI: The Undiscovered Country* echoed the coincident collapse of the Soviet Union and the demise of series creator Gene Roddenberry. In this atmosphere of significant finality, director Nicholas Meyer — veteran of two previous *Star Trek* features — marshaled the forces of Industrial Light and Magic and makeup supervisor Michael J. Mills to help realize on film the last mission of Captain James T. Kirk and the crew of the starship *Enterprise*. *Article by Kevin H. Martin.*

FRONT COVER — A mugwump engages Bill Lee in conversation in *Naked Lunch*. The *Enterprise* and the *Excelsior* sail into the sunset in *Star Trek VI* — BACK COVER.

RETURN TO NEVERLAND

article by

Mark Cotta Vaz

In sleep come dreams that allow us to slip the bonds of the material world and visit phantasmagoric places, meet strange beings, even sprout wings and fly. For many of the famous heroines of children's literature, sleep was the passageway to wondrous dreamlands: Alice fell asleep on a riverbank one drowsy summer day and in her dream followed the White Rabbit down the rabbit hole to *Wonderland*; Dorothy was taken up in her Kansas farmhouse by a cyclone that, after its first fearsome whirls, caused her to fall asleep and awake in the land of the Munchkins in the kingdom of Oz.

And then there was the strange adventure of Wendy Darling, the young girl who followed *Peter Pan* to *Neverland*. For an architect of dreams like Steven Spielberg, the *Peter Pan* story was irresistible, and his longing to tell the tale on the big screen had been common knowledge for years. By some strange alchemy, the director of *E.T.* and the *Indiana Jones* trilogy had even become identified with the ageless boy. And so it was not surprising when *Hook* — an updated extension of the J.M. Barrie tale by screenwriters Jim V. Hart and Nick Castle — captured Spielberg's imagination. The premise of the screenplay was a compelling one: What if *Peter Pan* left *Neverland* and grew up? "*Hook* is the story of *Peter Pan* at forty who has forgotten he ever was *Peter Pan*," said Spielberg. "He has become an acquisitions attorney who has no time for his children, a workaholic who has lost the child within himself. When his children are kidnapped by Captain Hook and taken back to *Neverland* in an act designed to lure Peter home for a final battle, Peter must remember who he once was with the help of *Tinkerbell* and the *Lost Boys* in order to fight Hook and rescue his kids."

image



*For Steven Spielberg, *Hook* was the realization of a long-held dream to bring an epic-scale retelling of *Peter Pan* to a whole new generation of filmgoers. Normally bigger-than-life, the celebrated director appears dwarfed by the gears and trappings inside an oversize clock home built for the tiny *Tinkerbell*.*



*A grown-up Peter Pan (Robin Williams) squares off with the infamous Captain Hook (Dustin Hoffman). In the screen story by Jim V. Hart and Nick Castle, the eternal boy has become the adult Peter Banning, a work-obsessed lawyer who has lost touch with his family — and the child within himself. When his children are kidnapped by the vengeful Hook, Peter is drawn back to *Neverland* where, with the help of the *Lost Boys*, he redefines his adult values while regaining his youthful zest for life.*

Hook —an Amblin Entertainment production for TriStar Pictures — would not only be a retelling of the *Peter Pan* story, but one of the most ambitious fantasy films ever mounted. With its reported \$70 million budget, big-name stars and lavish sound-stage sets, *Hook* recalled the Golden Age of Hollywood filmmaking. All of *Neverland*, from the Piratetown ruled by Captain Hook (Dustin Hoffman) to the magical treehouse home of *the Lost Boys*, would be built at Sony Pictures Studios on soundstages — the biggest in Hollywood — once owned by the legendary Metro-Goldwyn-Mayer. Establishing shots of *Neverland* would utilize matte paintings created by *Industrial Light and Magic*. “Although *Neverland* was built on soundstages, it was up to us to show the vistas,” said visual effects supervisor Eric Brevig, a newcomer to ILM who had won an Academy Award for *Total Recall* at Dream Quest. ILM would also be called upon to transform actress Julia Roberts into a glowing gossamer-winged *Tinkerbell*, while both the visual and special effects teams would be required to make *Peter Pan* (Robin Williams) fly.

Though ILM was responsible initially for only forty-four shots, the creative possibilities of the film proved alluring to Spielberg and the practical and visual effects shot count grew accordingly. “We ended up with two hundred forty-three shots — but our time schedule never changed,” noted effects producer Kim Nelson. “We always had the feeling that the show could grow, but we never thought it would grow by two hundred additional shots.” *Tinkerbell* shots alone soared from an original estimate of forty optical composites to one hundred twenty. And though it had been hoped to achieve *Peter Pan*’s flying largely through practical means, in that area as well ILM took on additional responsibilities. “We had known we would have to do bluescreen shots where Peter was flying above the treetops, or above the clouds, or maneuvering in and out of things,” Brevig said, “but after a while, when people saw how great the bluescreen shots were looking, we got more and more of the flying shots.”

Complicating matters for ILM was the requirement to do bluescreen work on the Sony soundstages virtually shoulder to shoulder with the first unit. The bluescreen unit which made the journey from San Rafael to the studio’s Culver City lot numbered some thirty-eight cameramen, sound mixers, boom operators, lighting technicians and grips. “Normally we would do the bluescreen work at ILM after the wrap of principal photography,” said Nelson, “but because of the schedule of this film, it had to be done simultaneously. Also, since most of the bluescreen shots involved Julia Roberts, and she was the principal actress, Steven felt he needed to be there to direct her. He couldn’t be in two places at once, so we sent a lot of our people and our equipment to L.A.”

All facets of the production, which commenced shooting in mid-February 1991, were under the gun of the Christmas release date written in stone by the distributor. During the preproduction period, the filmmakers wrestled with translating Barrie’s Victorian fantasy for modern audiences — particularly, bringing to life the dreamy *Neverland*. “*Neverland* is a place of the imagination,” said Spielberg, “not a three-dimensional place you can find on a map. Second star on the right and straight on till morning’ — that was the genius of James Barrie, creating a real world but not telling you where it was or what it looked like. So we set out to fill in the spaces.”

Given the strategy of shooting all the live-action on sound-stage sets, it was appropriate that John Napier, the theatrical designer of such celebrated plays as *Cats* and *Les Misérables*, was brought in to act as visual consultant. Norman Garwood, who had designed the Orwellian city in *Brazil* and the

civil war battlefields of *Glory*, arrived in Los Angeles from England to log ten months as production designer for the film. From the start, the aim was to capture that old Hollywood magic while retaining the childlike spirit of Barrie's fantasy. "In our initial concept talks," said Garwood, "Steven was very keen to have a traditional Hollywood look to the film while keeping to the Barrie story as much as we could. We didn't have an enormous amount of time, so the research was being done as the sets were being designed. In the conceptual stage you can let your imagination run wild. There was a lot of back and forth with a huge number of people getting ideas down on paper, which is what Steven wanted. We'd get approval from Steven and then make models based on the drawings. But the initial concept phase was to come up with the wildest ideas. The constraints come quickly enough." Realizing the set concepts would eventually require hundreds of craftsmen, with a materials list that included one million board feet of lumber, twenty-five thousand gallons of paint, two hundred sixty tons of plaster, ten miles of rope and six hundred thousand gallons of water to fill the harbor.

Piracetown had to balance the lowlife aspects of its principal inhabitants with the primal wonders of the *Neverland* environment. The resulting wharf set had as its centerpiece Hook's splendid *Jolly Roger*, a pirate ship inspired by 17th Century frigates. The set occupied Stage 27 — the same space once used for the Munchkin Village and *Yellow Brick Road* beginning in *The Wizard of Oz*. That soundstage, at two hundred fifty feet in length and one hundred fifty feet in width, was the largest available to the production and allowed the pirate vessel to grow to an awesome thirty-five feet in width, one hundred seventy feet in length and a towering seventy feet in height at the mainmast. The *Jolly Roger* floated in three feet of water in a specially built tank. "The shape of the boat was based on the kind of stage we could get," Garwood noted. "Stage 27 was the biggest stage we had as far as volume was concerned. It had the most amazing sort of split-level roof that went from fifty feet to eighty feet. Once we had that stage we could shape the boat. The boat grew from references, sketches and models. It was, for me, the most pleasing set of the lot. It was also the one that made visitors to the set totally gobstruck, everybody walking around it with their mouths open. It looked so massive — and pretty ominous and fearsome as well."

The interior of Hook's cabin on the *Jolly Roger* was built on a separate stage and measured approximately forty feet long by eighteen feet wide. A complex hydraulic rig was built by the special effects crew to tilt the set and thus create the effect of the rocking of the docked ship. "The entire base of the foundation was a steel frame built on top of two platforms and inner tubes with two hydraulic rams that could be controlled by a joystick to rock it at different speeds," explained physical effects supervisor Michael Lantieri, a veteran of numerous Amblin productions. Though the rig worked perfectly, Spielberg ultimately decided that the rocking motion was too distracting. "It was all ready to go, but Steven just made one of those on-the-spot choices not to use it."

Hook's fearsome, but elegantly detailed warship stood in stark contrast to the seedy Piracetown wharf cobbled together from the rotting remains of sailing ships stacked on top of each other. "The theory behind the wharf and town," explained Garwood, "was that Hook had scuttled all these ships and dragged them back and dumped them on the shore, and the pirates had used them to form a town. One of the ideas we had during the concept jam session was for a scene of Hook directing a salvage operation. A pulley was going to be lifting a wreck out of the water, and Hook would be

saying, 'A little bit over there, just to the left.' Dustin loved the idea; but once I got it cost out, there was just no way we could do it. It would have been the most expensive joke in Hollywood."

Stage 27 would be so crowded with the elaborate wharf set that a crane dolly was erected in the water tank beyond the *Jolly Roger* to provide a range of alternate camera positions for the principal photography. "We built a track down in the water tank that went right up to the surface," said Lantieri. "On this track was a tower thirty feet high with a camera crane arm and a camera operator. With that setup, we could dolly the camera arm and get some of the shots for the reverse angles."

In the film, the Piratetown wharf is the first place Peter Banning finds himself upon his arrival in *Neverland*. Peter has been in London with his family to honor Granny Wendy (Maggie Smith) for a lifetime of work aiding poor orphans. Wendy, who knows Banning to be the former Pan, watches aghast as Peter gnashes his teeth over a multibillion-dollar deal, and laments, ironically, that he has become a pirate. Finally she tells Peter that the old tales of *Neverland* are true and that Banning himself is the *Peter Pan* of legend, the sworn enemy of Captain Hook and all pirates. Wendy's revelations are the capper for an evening during which Peter's children are kidnapped. Only a cryptic ransom note is left behind, signed by Captain Jas. Hook, challenging Peter to come to *Neverland* and rescue his children. Taking refuge in strong drink, Peter staggers into the empty nursery where *Tinkerbell* suddenly appears, tossing her magical fairy dust and spiriting Peter from London to *Neverland*.

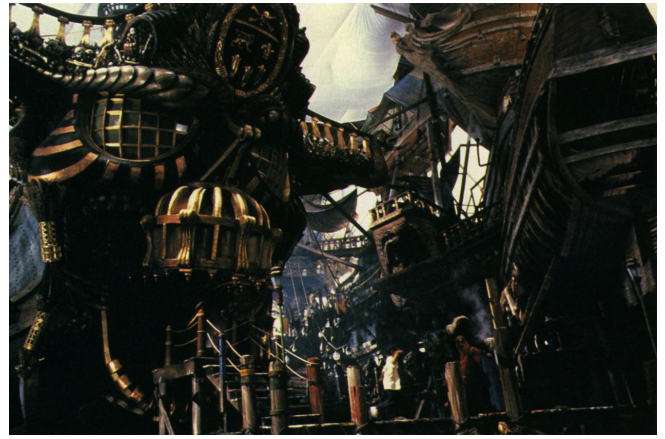
Tinkerbell was not only a pivotal character, but also one of the most complex effects in the film, requiring effects camera match-moves, computer graphics, digital and optical work. "The *Tinkerbell* effect, in general, consisted of three motion control elements," said Bruce Walters who supervised the effects camera work. "There was the bluescreen element, the wings which were shot separately and the glow ball. In addition, there was a separate fairy dust element for particular shots."

The technology applied to *Tinkerbell* was not far different from that which had been used for the magical fairies in *Willow*. In that film, fairy wings were created by photographing three-inch plastic wing models on a motion control 'flapper' rig. Set in a tilt-and-roll rig, with motion control moves aligning the wings to bluescreen flying figures, each fairy and set of wings was then pin-blocked with added animation and interactive glow effects. *Hook*, with its greater number of shots and additional elements that had to be included in each, pushed that technology even further. "In *Willow*, the fairies were not essential hero characters," said Brevig, "so the inevitable quality loss that we got by photographing them on this little pin-block was okay. But we wanted to improve upon the photographic quality of the elements for *Hook*. After all, this was Julia Roberts and we wanted to see her face. So we created her flight program on the motion control camera and then that program was given to the optical department. Optical could then take that element and do a pin-block move — which is rephotographing the element under a motion control device that copies it, allowing the element to be moved around on the optical printer in frame in a manner that could never be done physically with a human on wires. So the quality was first generation on the printer, but it had a move that was created in another department."

The *Tinkerbell* bluescreen footage was the responsibility of key effects photographer Kim Marks and bluescreen unit manager Edward Hirsh. Three separate bluescreen stages were required for the filming of both *Tinkerbell*'s and *Peter Pan*'s flying sequences. Though a variety of flying rigs and camera setups were used throughout the shoot, in general, *Roberts* or her stunt double were fitted into a harness under the *Tinkerbell* costume and suspended from overhead tracks by wires joined at each hip point. "The camera had an image stabilization head on it," explained Hirsh, "and was moved in and out on a crane. The crane itself was on a motion control track." For each movement, adjustments had to be made to accommodate the difference in scale between the real-size *Roberts* and the one-seventh-scale *Tinkerbell*. "We had to multiply everything by a factor of seven, which meant she was having to move something like twenty-eight feet in one to two seconds. Obviously, we couldn't physically move her that distance that quickly; so instead, we moved the camera in and out, generally on a z-axis with a boom for x and y patterns." Even the crane could not move fast enough, however, to compensate for the difference in scale. "We ended up undercranking the camera down to twelve or eighteen frames per second," Marks noted, "effectively doubling our time and allowing us to make the distance."

Undercranking, though solving one problem, created another technical dilemma, particularly for scenes in which *Roberts*' off-camera dialogue needed to be dubbed into scenes of her stunt double interacting with other characters. Such a scene occurred when *Tinkerbell* first appeared in the London nursery.

Alighting on an ink pad, Tink walks onto the cummerbund of the tuxedo Peter is wearing, marches up his shirt, leaving tiny footprints all the way, and keeps talking until Banning cries out, causing the fairy creature to flutter backwards. First, a background plate of Robin Williams was shot. A doll the size of *Tinkerbell* was used in the scene to help the actor focus his eyeline. The film was then analyzed to ascertain the number of frames that elapsed as Peter's eyes supposedly followed *Tinkerbell*'s actions. Using that information, *Roberts*' stunt double was then shot against a bluescreen, performing the actions at twelve frames per second to endow the tiny creature with an



In a nod to the Hollywood of old, Hook was filmed entirely on lavish soundstage sets conceived by visual consultant John Napier and production designer Norman Garwood. The most impressive of the large-scale settings featured the pirate ship Jolly Roger — fancifully inspired by 17th Century frigates — afloat in a specially built tank abutting a wharf area built ostensibly from the rotting remains of scuttled ships.



On an adjacent stage was constructed the town square which had as its centerpiece Hook's old nemesis, the crocodile, now stuffed and serving as a thirty-foot-tall clock tower. During the seven-month shoot, Hook would occupy most of the principal soundstages on the Sony Pictures Studios lot in Culver City.

appropriate sense of mass. “Because we shot *Tinkerbell* undercranked,” Kim Nelson observed of the setup, “elaborate steps had to be taken to keep the dialogue in sync.”

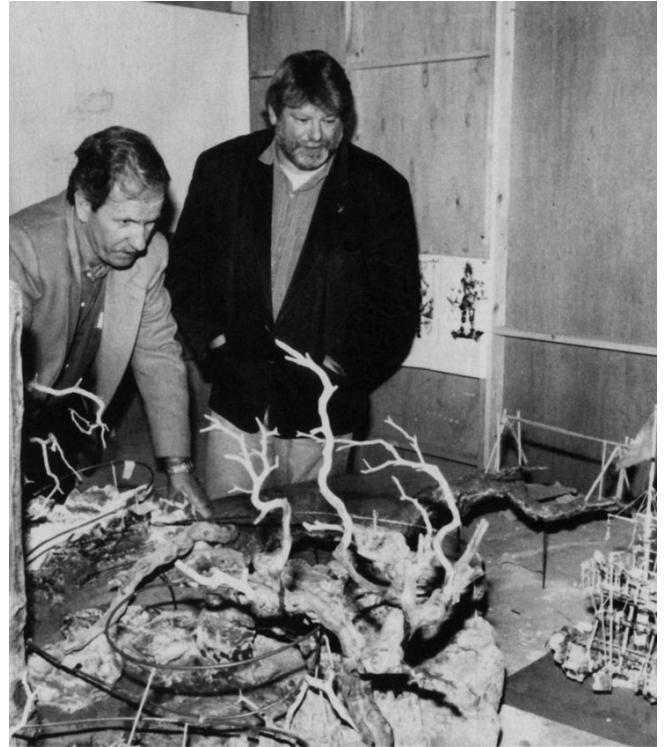
“The voice was supposed to be *Julia*’s,” Brevig elaborated, “but, obviously, she couldn’t talk at half-speed. So we had *Julia* record her lines at normal speed and then we dubbed that onto the background videotape of Robin’s action. We would play that back on the set at half-speed while we superimposed — using a video tap on our film camera — the live image of our stunt person walking around a big bluescreen background. To keep the half-speed dialogue intelligible so the stunt double could lip-sync to it, we used a voice harmonizer to get the half-normal-speed voice back to normal pitch. The harmonizer is a digital device that changes pitch instantly. So if we’re playing back at twelve frames per second — which is half normal speed — we can harmonize it a full octave and that brings it up to normal sound. It allows the performer to hear, understand and mouth dialogue that’s being played back at any speed. Without it, they’d get lost.”

The *Tinkerbell* element for the interactive ink pad walk required special preparations during the bluescreen shoot. “We had to build contoured shapes to represent all of the things *Tinkerbell* was walking on so that her body attitude would be correct,” stated Brevig. “We filmed *Julia*’s double on wires, jumping about fifteen feet and landing on a bluescreen box, then stepping onto a bluescreen card and walking up a carpeted wooden shape that was built in the contours of Robin’s shirt.”

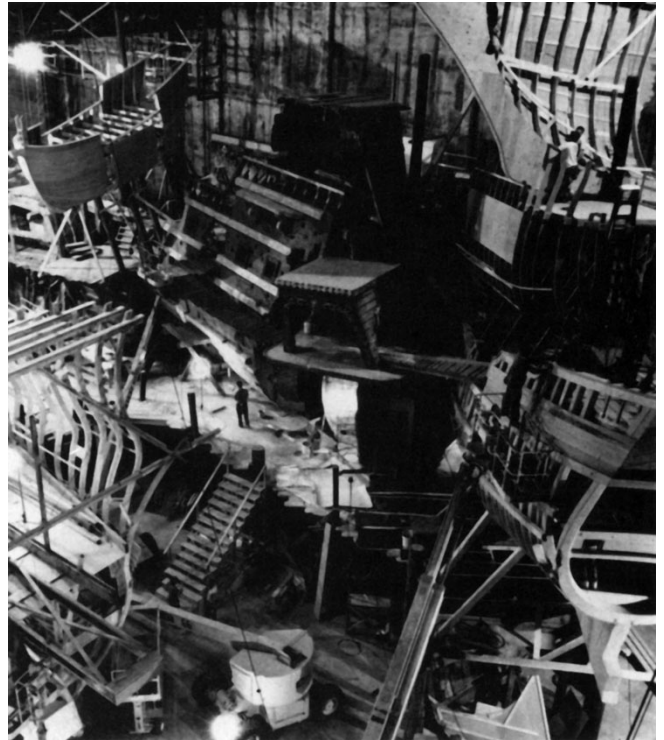
Completed bluescreen footage was then sent to the effects camera department where it was positioned into the background plates by Charlie Clavadetscher and Patrick Myers. “We’d get a print of the bluescreen footage,” said Clavadetscher, “and start programming the moves, refining the motion control program until it was what they wanted. Sometimes there were very specific things Tink needed to do, and those were the easiest to plot. Some of the interactive scenes were very straightforward — like when she first flies in, grabs Peter’s bow tie, pulls on it and lets go. But it became a little more creative if she had to fly in frame and hover and deliver pixie dust. Then we would have to look very carefully at what she was doing in the original plate and build motion on top of that. I would use motion control to plot out the different moves. If in the original bluescreen photography she got too big too fast, I would have to shrink that growth down; if she started to drift too far left, I would need to pull her right; if she started tilting over too soon, I would have to tilt her back. By doing that, her action matched the timing of what was happening in the background plate.” Clavadetscher also worked to refine the flying effect, removing any excess motion from the bluescreen elements. “To get a locked, controlled image he could fly around,” said Bruce Walters, “Charlie would first take out any physical or mechanical instability in the plate photography. So he was not only putting movement in, he was taking unwanted movement out.”

Tinkerbell’s fluttering wings were shot separately under the supervision of Myers. Three pairs of nine-inch wings were constructed by model shop supervisor Lorne Peterson and associate Richard Miller. “The wings were made of two thin sheets of plastic with a thinner sheet of chatoyant film in between,” stated Peterson. “Chatoyant film is a clear cellophane with a luminescent cat’s-eye quality to it. Those wings were to be used for all the flying scenes and were mounted on a motion control wing-flapper built by Jeff Wilkins. We also made a big pair of wings — about two-and-a-half feet long — that *Julia* was going to wear whenever she wasn’t flying. They were just going to lay flat on her back. Early on, however, there was a scene where *Tinkerbell* was watching young Peter with Moira and Steven wanted to make her look sad by having her wings droop. So that shot was done

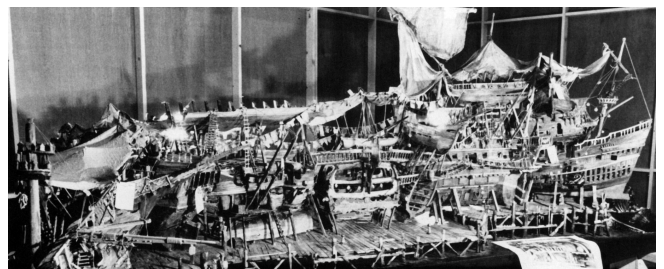
optically with the nine-inch wings. Steven liked it so much that he decided there should be some sort of wing movement — a simple flutter or whatever — in almost all of the shots. So about ninety percent of them were switched over.” It was this decision that most markedly increased the number of visual effects shots in the film.



Each of the major sets was built first in miniature. During preproduction, producer Gerald R. Molen, accompanied by Norman Garwood, examines portions of the Lost Boys' treehouse retreat.



The pirate ship and adjacent wharf were designed to fill the studio's largest soundstage from wall to wall and from floor to ceiling. Many of the plundered vessels which comprised the wharf were later recycled and incorporated into the shantytown set.

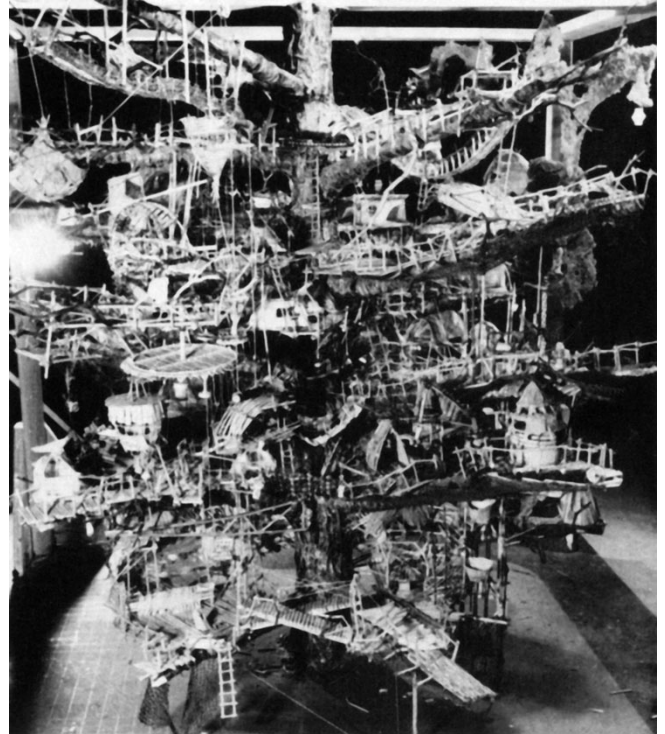


As with the other settings, a detailed model of the wharf area was fashioned prior to actual set construction.

For Myers and his camera operators, Pat Sweeney, Ray Gilberti and Colin Campbell, the first task was aligning the wings to the *Tinkerbell* plate imagery, then adding life and performance to each wing beat. “If *Julia* was moving her arms back and forth real quickly,” Myers explained, “I’d use that as a timing tool, taking it frame by frame. We were shooting the wings in a go-motion mode with stop-motion between frames. I would motion control the wing rig so it would match up to her specific body positions, then go in between frames and do the wing flap manually. We established certain characteristics of the wings — for example, any time she left the ground for more than two frames there would be a little wing beat. If she threw out her arms, that would be embellished by having the wings pop out. If she was angry, they would beat at a faster rate, while if she was sitting sedately they would flap at a slower rate.”

The most magical components of *Tinkerbell* were her body glow and pixie dust effects. “Steven wanted Tink to have different looks at different times in the film,” said effects art director Harley Jessup, “and we had to work out transitions between each of those looks. At certain points, she is just a glow with no body showing as she zips around very quickly in the scene. Then, in closeups, we’d ramp the glow down so you could see her body shape. When she landed her glow would go out completely.” The *Tinkerbell* glow elements had to appear as if they were emanating from the fairy herself. “We worked different diffusions and matte techniques to put glows around the edge of her body,” said optical supervisor John Ellis. “We used warm yellow and amber sorts of tones and we took her highlights and made those glow separately. The glows made her more magical and added energy and life to the character.”

The final *Tinkerbell* element was the fairy dust. That work was divided between the animation department, which created particles that would interact with a character or object, and the computer graphics department, which animated flowing trails of dust. “What we were going after with the pixie dust was something very soft, very glowing,” Jessup commented, “as tiny a particle as



The conceptual model for the ‘Nevertree’ living area was much more elaborate than the full-scale rendition ultimately built.



*To translate it fully onto stage would have necessitated a structure nearly eighty feet tall — which in addition to being very costly would have been a potentially hazardous work environment for the child actors playing the *Lost Boys*. Consequently, the ambitious design was scaled down to more modest proportions.*

we could get. It had to have a look that was soft and not threatening in any way. We also had to work on how fast the particles would drop and the way in which they would cascade. We started out with storyboards that basically showed what the pixie dust needed to do. Then we used Photoshop — a computer graphics program — to create concept artwork that would give the animators a starting point.”

Computer graphics supervisor Stefen Fangmeier oversaw the animation of the computer generated pixie dust trails. “We have a particulate system which allows us to take a generator — like a sphere — and move it through a scene, leaving a trail of little particles that can then be designed to look like snow or blood vessels or pixie dust — whatever we want. We can also assign it a certain behavior. So for the pixie dust shots, we would scan in those frames and roto this little generator source to *Tinkerbell*. Next we would have the generator release a trail of pixie dust, all the particles animating properly so the trail matched the pixie dust made in the animation department.”



Industrial Light and Magic — under effects supervisor Eric Brevig — put the magic into more than one hundred Tinkerbell shots. Most of them entailed live bluescreen footage of actress Julia Roberts combined with separately photographed miniature wings and animated glow elements. In the London nursery of Granny Wendy’s home, Tinkerbell tugs at Peter’s bowtie, urging him to follow her back to Neverland.



In the background plate, Robin Williams reacts to the unseen fairy as his bowtie is pulled from off-camera by an attached wire.

Although computer graphics had the ability to create masses of particles with a range of characteristics — from rate of fall to brightness — and track them frame to frame, the parameters of the program made it difficult to effect, in a timely manner, any interaction of the particle elements with objects. Traditional animation was required to create such interactive areas of the fairy dust stream. “I had a shot where *Tinkerbell* first appears in the nursery,” said animation supervisor Wes Takahashi, “and while she is yanking at Peter’s bowtie, she throws a handful of dust in his face, prompting him to sneeze. The elements for that shot were general pixie dust, interactive light, specific nose dust and bounce dust. Because there were so many dots going on, it was easier to keep track of the dust bouncing off of the head and tracking that animation, keeping it separate from the dust heading for his face. There also had to be interaction of the particles that prompt his sneeze, so we had an element of the dust going up his nose as he inhaled.”

The animation crew worked with photostats of each frame of film, tracking their artwork to overlay perfectly with the actor. For each animator, that meant sometimes thousands of separate particles over the course of one shot, all hand-inked in black before being sent to optical for color and diffusion work. Tying together the mass of both computer graphics and animation particles was a special background element. “We created an ‘air-brushy’ gas element for which we could randomly animate groups of dots,” Takahashi explained. “CG had to emulate that background look, giving fluctuations of exposure and intensity for dust falling in air. That mass was enveloped in a glow that gave an impression of more dust than was actually there. The gas element background also acted like a kind of soup that this pixie dust stew existed in — a diffused, gaseous-looking light that the individual particles appeared in.”

Tinkerbell’s shadows as she walks up Peter’s shirt were also provided by the animation department. Pencil drawings of the shadows were rendered and then sent directly to the digital department, foregoing the traditional route of producing hand-inked animation cels for optical processing. “Without the ink-and-paint phase,” said Takahashi, “we sidestepped one more possible loss of resolution. It was a subtle, but in my mind monumental, achievement. Since there were a couple of light sources in that shot, Tony Stacchi had to animate two different shadows, with two different perspectives, both matching her action and conforming to Peter’s body. The outlines of the shadows were shot onto black-and-white film, scanned into digital information, at which point those



*Suspended from a flying rig, Roberts was photographed performing the bowtie-tugging action in front of a bluescreen. To compensate for the character’s one-seventh scale, bluescreen elements of *Tinkerbell* were shot undercranked. / Camera operator Pat Sweeney adjusts the motion control flapping rig used to maneuver the *Tinkerbell* wings that were match-moved to align correctly with Roberts’ body in the plate photography.*

outlines were filled in and became solid shapes. Digital did a great job of creating the diffusion and amount of density needed to make those shadows look absolutely real.”

Digital processing was also used to composite the Peter Banning and *Tinkerbell* elements, as well as provide the animation for Tink’s tiny footsteps. “We got the *Tinkerbell* wings and glows from Charlie and Pat in effects camera,” said digital effects supervisor Bruno George. “Then we had to track Tink walking up Peter’s shirt, add the indentations of her weight as she takes her steps, and work the move later in the shot when Peter shouts and she flies off, adding two or four shadows for the wings and the shadows from two different light sources.”

Essentially, the digital compositing process entailed extracting the raw bluescreen material, saving a matte, processing the holdout part of the extracted matte in the background, and then taking the burn-in portion of the extracted matte and putting that back over the top as digital steps. “In the shot, *Tinkerbell* was a separate element, the wings were separate and the glow ball was separate. In addition, Peter, the animation shadows and some references were all separate. We ended up having to do considerably more film testing than I had originally expected. While we were figuring out where we needed to place *Tinkerbell* as she walked up the shirt frame by frame — analyzing that and checking it for motion — there had to be color balancing decisions made for the wings, the glows, Tink herself, the background and the shadows. We also created some hand-painted transitions for the indents in his shirt as she walks up. Those involved making half a dozen little elements that we dissolved between to make it seem like Peter had a weight on his shirt. We also had to work on some helper elements for the bluescreen extraction and an articulated wire removal. It all required a good amount of hand processing.” Digital also had to make certain that the *Tinkerbell* figure stayed locked onto Peter’s body as he breathed, as well as place her inky footprints on his shirt. “That shot was around our department for about six weeks. Steve Price and seven composite



More than twenty highly detailed matte paintings were employed to enhance the magic and scope of the stagebound production. Many featured live-action elements — such as waterfalls, breaking waves and spectacular sunsets — strategically rear-projected into designated areas. Matte artist Chris Evans works on an expansive rendering of Neverland island.



operators worked on it with a lot of help from the digital roto people.”

In the film, *Tinkerbell* lives in a little clock house perched in the treetop dwelling place of the *Lost Boys*.

In Barrie’s tale, the boys lived safely hidden

underground in a cozy home they could reach through the hollow trunks of seven large trees. As back-story for the Spielberg version, Captain Hook, furious at Peter for having left *Neverland*, was to have finally discovered that hiding place and put a torch to it. So for Hook it was necessary to give the *Lost Boys* a new home. John Napier visualized an offshore retreat for the boys — a huge spire of rock jutting up from the ocean with a single giant tree growing on its summit. From their perch in the ultimate treehouse, high atop their rock island, the boys could keep an eye on Hook’s *Piracetown* and most of *Neverland* island. “*The Lost Boys*’ tree island had to be separate enough so it would be obvious why it was a difficult fortress for Hook to broach,” said Jessup. “Yet Hook’s ship and the *Piracetown* had to be close enough to be clearly visible from the tree so that Peter would constantly be reminded that his kids were down there in jeopardy.”

The set designs for the *Lost Boys*’ fortress incorporated the idea of contradictory natural forces existing within a single environment. At the base of the ‘*Nevertree*,’ the four seasons would exist simultaneously in separate quadrants: snow falling in one wintry section; flowers always blooming in the springtime area; a waterfall cascading in a summertime grove with an urban-style playground complete with skateboard ramps and graffiti; and an autumnal spot thick with multicolored leaves. Dressing the set required a greens department to bring in soil and plant vines, ferns and moss. “There were a lot of plastic snowflakes and a lot of plastic greens,” Lantieri noted, “but we were very careful that anytime we were going into closeups we had the real stuff. We even went to the extent of using chipped ice for the closeup snow scenes. A company that made chipped ice for snow cones brought it in by the truckload.”

Encircling the base of the *Nevertree* and connecting all the seasonal elements was a roller coaster track. “With the track,” said Garwood, “you could make a circuit around the seasons by wind surf or skateboard. For the upper part of the tree, Steven had this lovely idea of its being like a big Christmas tree, except, instead of ornaments, the kids would have their homes. Another part of the thinking was that they could get to each other’s little places by means of ropes and baskets that went up and down — sort of a Rube Goldberg means of getting from top to bottom as quickly as possible.” Because of financial constraints, the original grand design for the *Nevertree* was ultimately simplified. “In our conceptual model, the top of the tree was far more complex. There were machines that could take water and such up to the top. The tree was originally going to be eighty feet tall, but the budget for that was extremely high. There were also concerns about having the kids at that height. They would have had to be on safety harnesses, and stunt people would have had to do all the moves for them. So, mostly as a safety precaution, we scaled the tree set down.”

The *Nevertree* set came to life on Stage 30, in the water tank that had been used in MGM’s glory days to film naval battles and Esther Williams extravaganzas. “We ended up putting the bottom half of the *Nevertree* down into the empty tank to get as much depth as possible,” Lantieri explained. “Because the tree was supposed to be so tall, instead of going up we went down — our ground zero

Signifying the end of the film, Peter reflects on the joy of his friends. The clock justifies the place of the boys in the world. The bell around the photograph of the boys, only a shadow, was enhanced with live ocean and sunset elements and Robin Williams in the *Nevertree* set.

was fifteen to twenty feet below the stage floor. The track around the tree was built out of pipe and had a kind of monorail cart that ran on it. We dressed the carts with hubcaps made of coconut halves and bamboo — anything to hide the current technology. So after we got it all working and laid out, we then dressed it with natural things that grew or could conceivably be found in *Neverland*.”

The natural look was extended to the weapons and battle gear used by the kids when fighting the pirates. “We got a materials list together before we started building,” said Lantieri. “We decided the *Lost Boys* would have bamboo, bark, leather, animal skins — all the things you would find in *Neverland*. Everything had to be organic — no plastics or vinyl. Even the little helmets they wore were made of old gourds and their armor was made of bamboo.” State-of-the-art weaponry included egg and tomato launchers and a colored paint gun. “The egg launcher was built out of wood; but inside, it had air lines and would shoot yolks from a tank and eject a cracked egg shell out the side. All the mechanics of the weapons had to be hidden with either bamboo, wood or leather. So the first half of the job was getting all that stuff to work; the second half was getting it so you couldn’t see how it worked.”

Peter’s arrival at the great heights of the Nevertree is accomplished in the movie by hoisting him from the ocean via a giant, open-faced clamshell. The clamshell ascent immediately segued into the centerpiece establishing shot of the magical island known as the ‘*Neverland* reveal’ — realized completely through the medium of matte paintings.

The twenty-some matte shots in *Hook* clearly set a new standard for the fusion of painted imagery with live-action plates, as well as the use of motion control camera moves and digital and optical compositing techniques. “On *Hook*,” said Bruce Walters, “the matte paintings were not simply there to put a ‘roof’ on a set or location. Here the paintings were being showcased. In fact, I can’t think of another show where matte paintings were up on screen as long. We used just about every technique available for the matte paintings, except front projection. We used rear projection, bipack mattes, duping boards, ripple gags, and digital and optical processing.” Not only were the *Neverland* matte paintings prominently featured, they were also intricately detailed, combining painted foregrounds and backgrounds with miniatures and live-action photography. “An unusual feature of these matte paintings was that we precomposed them as much as we possibly could before passing them on to



Both matte paintings and miniatures were required for a pivotal scene in which Peter is hoisted out of the ocean in a giant clamshell and lifted into the Nevertree. For maximum detail and accuracy, molds were taken from actual rocks and tree stumps and exposed roots. Flexible urethane castings were then made and pieced together to form the lower part of the sixteen-foot miniature. The Nevertree perched on top was carved from a wooden dowel and then dressed with manzanita branches and air fern leaves. Mark Sullivan works on the painted backdrop

optical or digital. We had such a bulk of work that needed to be done on the paintings that we couldn't just take a box-full of elements and say, 'Here — you put it together!' So we put in as many of the live-action plates as we could before it went to the next department. Some of our shots had as many as thirty or forty different elements in them before they went out of the department."

while modelmakers Tony Sommers and Ease Oweyung add finishing touches to the tree.

Supervising matte artist Mark Sullivan began on *Hook* during its preproduction phase, working with Spielberg, Napier, Brevig and Jessup to establish the scale and look and proportions of *Neverland*. To make the two-dimensional medium of painting come to life, it was decided to incorporate within the matte shots as many live-action elements as possible. "There were real clouds moving through shots, real waterfalls, real breakers hitting the shoreline," said Sullivan, "all enhancements to make the paintings seem more realistic. We were also very mindful of light direction and perspective when we shot the live-action elements so that they would fit into the painting we were going to be doing later."

The first shot in the clamshell sequence, a wide establishing shot, combined live-action plates of a big rock off the Hawaiian island of Kauai with a painted rock that covered the rest of the expanse to the Nevertree. "In this composite," noted Sullivan, "Jon Alexander in the optical department did a motion control move, scanning the Vistavision negative of the painting and live-action plate by moving the element in the printer so they overlapped. For this wide shot, just to add a little bit more life to an otherwise static matte painting, I applied some cutout birds to the surface of the painting. We sent rotoscoped drawings of birds to a company that does photo etchings, turning these drawings into tiny metal bird shapes. Then we used replacement animation to fly the birds through the shot, applying the cutouts with magnets attached to the back side of the painting so as not to scar the surface with adhesives."

For both the wide clamshell shot and a succeeding shot facing up into a matte painting of the Nevertree, the live-action bluescreen element of Peter in the clamshell was shot in natural sunlight, with actor and clamshell prop being lifted by crane against a building with blue backing draped over the side. The shot normally would have presented the optical department with the difficult, if not impossible, task of extracting a good matte from the sunlit backing — but, here again, digital technology came to the rescue. "It would have been really crummy bluescreen for us," John Ellis acknowledged. "To drape a blue cloth over the side of a building and shoot an element outdoors would be suicidal, optically. But the digital process allows us to do bluescreen shots that would usually have to be done under tight studio lighting. In this case, it enabled the production to shoot a really big shot outside — something they wouldn't have been able to get on a soundstage. The masters of digital can scan film into their computers, transform those images into pixels, and then manipulate those images with a measure of control that we couldn't begin to get in optical. Bruno George digitized the clamshell, put it through his process, and then gave it back to me as a negative of a clamshell against black. Basically, he gave it back to optical as a workable element."

Incorporated into the clamshell ascent was a sixteen-foot model of the Nevertree. "The model had three sections," said Lorne Peterson. "First there was the rock base. Since I knew the shots were going to be fairly close onto the model, I had a crew go out to the Marin headlands and take rubber molds off of specific rock formations that I had selected. From those molds, we made flexible

urethane rocks and just spliced them together like a big mosaic. On top of the rock was a giant tree stump with lots of exposed roots — which we also cast from life and pieced together. Out of this stump grew the actual Nevertree. The main trunk was carved out of a large dowel that we tapered on a lathe and then textured. The branches were manzanita branches and the leaves were a type of air fern. Ease Owyung built a lot of mechanical stuff up in the tree — pulleys and windmills and things — like *the Lost Boys* had done kind of a Gyro Gearloose job on it.” Though constructed specifically for the one sequence, the Nevertree model proved valuable to the matte painters who used it as a reference for their work. “They would drag it out into the parking lot and shoot it — sometimes from on top of the building — to get photographic reference material. The model worked well from all different angles.”

The *Neverland* reveal matte painting was the spiritual centerpiece of the movie. Peter, deposited by the clamshell at the base of the Nevertree, climbs up a rocky ledge for both his and the audience’s first look at *Neverland*. Though the matte department had begun the design process for the *Neverland* reveal shot as early as January, a final design did not congeal until late the following May. “Because of the difficulty in scheduling the shooting of Robin Williams’ bluescreen foreground, we didn’t begin the actual painting until late September,” said Sullivan. “And that shot had a pretty long incubation period before we decided on the overall layout and what elements would be put into it. In the course of its development, Yusei Uesugi, Chris Evans and I did about ten little sketch paintings for this one shot. For these conceptual sketches, I went through books looking for idealized photographs from different areas around the world. I combined mountains from the Alps and the Himalayas with Yosemite Falls and forests from New Guinea, trying to make it look as if these settings could somehow exist together in one plane. The thing we really had to pay attention to was the natural phenomena that would occur, such as everything being in the same lighting direction. Also, instead of having an alpine mountain positioned abruptly next to a green forest, I tried to segue the trees and greenery into the scenery gradually. We added natural phenomena like waterfalls and moving mist layers to help draw these contradictory areas into each other.”



Although scenes in which Tinkerbell appears with other characters generally required bluescreen composites, solo scenes were often obtainable with process photography or oversize sets and props — among them a dollhouse found in Wendy Darling’s nursery.



Digital technology was utilized to help create Tinkerbell’s shadows and pixie dust trails — also to composite specific bluescreen shots of the fairy’s interaction with full-size characters. Digital team member Carolyn Rendu studies a Tinkerbell element on a computer monitor.

Another challenge of the *Neverland* reveal was to present a fantastic landscape that would not overwhelm the audience with visual information. “We had to emphasize the impact of seeing this amazing vista for the first time. The thing we had to get across was the geography of this place, to draw the audience into the amazement of *Neverland*. We couldn’t have too many focal points, but we wanted to show the pirate ship, the pirate cove and this contradictory landscape of snow-covered mountains existing with huge waterfalls and tropical shorelines.”

Live elements were integrated into the *Neverland* reveal painting. “In addition to the live-action foreground, we included live waterfalls shot in California at Yosemite and Mount Shasta. We also used Hawaiian shorelines for both the left and right sides of the island. A big skull-shaped rock had waterfalls coming out of the eye sockets — actually sugar poured through openings in a styrofoam sculpted rock head and filmed at ninety-six frames per second. All these, plus other film elements, required separate passes and were rear-projected onto small screens located in the areas they would occupy in the finished shot. It was a standard way of adding live-action into a painting. The tricky part was that it all had to look like it was photographed from one camera.”

The shot was designed to follow Peter clambering up the rocks, then boom up to reveal the astonishing vista. To achieve the illusion, camera operator John Graves fed the recorded motion control boom, tilt and pan moves from the bluescreen shoot in Los Angeles into the motion control cameras that photographed the eight-foot-wide, six-foot-tall matte painting. “With the beginning of the shot, the camera starts to correlate the perspective with the live-action foreground; then, as the shot progresses, it tilts down. There were middle-distance rock columns that were actually two-foot-tall models set up between the camera and the painting and carefully lit as if they actually belonged in the same world as the painting. The rocks helped create a parallax shift, a feeling of something averaging between foreground and infinity. It looked like the rocks were maybe three hundred to four hundred feet away.”

Live-action elements also ensured realism for a key matte painting that featured Peter Banning gazing out at *Neverland* and Hook’s pirate cove during a sunset reverie atop the Nevertree. The painting, rendered by Yusei Uesugi and shot by matte camera operator Steve Reding, would be used twice — once for some twenty seconds on screen. The outline of *Neverland* was painted on a two-foot-wide sheet of glass. “It was a hard-edged matte of *Neverland*,” said Sullivan, “left clear where the sky would be composited in. Taking this small painting, a camera crew went down south of San Francisco and found an unobstructed view of the horizon across the ocean. They set the painting up in front of the camera, using a viewfinder to make sure it was in exactly the right place, and shot about two thousand feet of a real sunset. The crew went down on three different occasions until they got one that was overwhelmingly spectacular. The scene was then painted to fit into the black matte that was shot in front of the live-action sunset. It also incorporated live-action ocean elements shot in Hawaii.”

Peter finally flies again after rummaging through the ruins of his old tree home and recalling at last that dreams of fatherhood were the reason he left *Neverland*. His children are the happy thought’ he needs to achieve this aviatric feat. During a flashback, a young *Peter Pan* wrestles with his unruly shadow — an effect that combined a live-action plate of the actor Ryan Francis with a taunting cel animation shadow created by former Disney animator David Cutler. “David did the character

animation by drawing the outline of the figure,” said Takahashi. “Then the digital department did a fill process. Digital also created the rotoscoped articulate edges and added a little distortion on the shadow to give a more angled perspective.”

As *Peter Pan* reborn, Peter lifts into the air and begins a triumphant flight over *Neverland*. The master flyover shot would ultimately incorporate a bluescreen flying element, two layers of stage clouds with a computer generated shadow of the flying figure, synchronized motion control moves on the separate cloud and flying *Peter Pan* elements, and extensive image processing to composite the live-action with a matte painting of *Neverland* below. Other scenes would involve more straightforward bluescreen and practical applications. For bluescreen shots of Robin Williams flying straight up into the camera, a classic effects illusion was employed. Although it looked as if he were in motion, Williams was actually stationary while the camera moved toward him. The bluescreen crew controlled the camera movement with counterweights rigged by unit grips. “It was Stone Age motion control,” laughed Kim Marks. “We’d say action’ and the grips would start pulling the counterweights down or letting them go up. We used a descender, a mechanism that uses wind resistance and the physics of a decreasing diameter cone. A cable was wrapped around the cone. Toward the bigger end of the cone, the cable played out quite fast; but as the cable got down toward the smaller end, it played out more slowly. Dropping the camera on the descender rig, it could start out moving very fast and then rapidly decelerate. For those shots where Peter just flies by camera, we didn’t want to be decelerating as we came up to him, so we’d try to be at maximum speed as we passed by.” With a celebrated actor dangling on wires high above the ground and the camera descending at fifteen to twenty feet per second, safety was of primary importance. “There was one shot where the camera was supposed to come right in his face,” Ed Hirsh recalled. “For safety considerations, we did that one in reverse.”

Because of the scope of the flyover shots, *Williams* was filmed on a stage that was eighty feet tall and seventy feet square. “We needed the height to maximize the distance we could travel,” said Marks. “The flying rig would be cabled up to the roof about ten feet from the ceiling and then all the way to the floor, which gave us a good seventy feet to work with. The flying scenes involved hanging the cameras in very strange positions. Sometimes we had to rig *Robin* so that he could do flips or barrel rolls or spins. Sometimes the camera would be pointed straight down so we’d have to put bluescreen on the floor. Other times we used what’s called the ‘doghouse’ — where an operator in an overhead cage would have a steering wheel that controlled the wires *Robin* was hanging on.”

For cloud elements in the flyover sequence, a seventy-foot-long cloud field was built on ILM’s motion control stage. Armature wire provided the basic shape, around which a polyester fiberfill material was sculpted. Later, the computer graphics department would do image processing to fluff out the hard edges of the fiberfill and then matte in the cloud element. The most ambitious aspect of the task was texture-mapping *Neverland* island — transforming the two-dimensional painting into a three-dimensional scale that would show a perspective shift as Pan flew down toward the isle. “We actually built a little island in the computer,” said Stefen Fangmeier. “We scanned in the painting, built some three-dimensional geometry that conformed perfectly to the shape of the painting of the island, and then sort of ‘wallpapered’ the matte painting over the computer model with the texture-mapping technique, using the color information we had obtained from the

scanned-in painting. It was a subtle effect. Since we were flying over a big island, there wasn't much perspective change."

"Once the painting was texture-mapped onto the wire-frame form of the island, it became animated," Mark Sullivan elaborated. "For instance, if we took a rock in the foreground, the program could, as it moved closer to us, take some of that background color density, shape and texture and mimic what was going on in the painting. So as the rock moved towards the camera, it revealed a background that didn't actually exist."

Elements for the *Neverland* flyover were composited digitally. It was the computer graphics department's responsibility to ensure that all the motion control camera moves matched — particularly that the separate elements of the flying Pan and moving cloud layers moved in relation to one another. "I designed my flight in the 3-D animation system with the camera tracking toward the island," Fangmeier explained. "That flight information — my camera move — was then given to the big motion control rig to program that camera to fly over the cloud field layers. I got that film back and scanned it in to do some image processing on the clouds. We had more than five hundred frames of clouds — and because they were shot against black, I was able to matte them by numerically extracting information. I could then composite the two levels of clouds back over the island. Then I had Peter as an extracted bluescreen element to which we applied a move so he would actually fly down to *Neverland*. There was also a computer generated haze element in front of the camera to create realistic atmosphere. I added another haze element to the island painting — we wanted the haze to obscure the island a bit more, to make it seem as if it was further away. We also added in shadows of Peter on the clouds, which was very tricky. Traditionally we would have effects animation paint in the shadows; but since it was such a long shot, we took the bluescreen element and mapped it onto the clouds using our animation system."

For the climactic battle in which Pan defeats Captain Hook, rescues his children and restores order to *Neverland*, Williams was required to fly around the Nevertree and Piratetown sets. To achieve the complex practical shots, the special effects crew built a grid of track high above the floor of each soundstage set. "We had our camera operator with a Steadicam in a basket that traveled by electronic control along the beams," said Michael Lantieri. "Normally, flying is done with a stationary camera, with the actor flying by the camera, or towards it or away from it. But in



Hook looms threateningly over Tinkerbell. Julia Robert's performance as the pixie was filmed largely on bluescreen stages that — because of a crushing time schedule — were set up to operate in conjunction with the main unit rather than in postproduction as is customary.



Many of Robin Williams' flying scenes were also filmed against bluescreen. The most complex was Peter's exultant flight over Neverland as the newly reborn Peter Pan. The master flyover shot featured a bluescreen element of Williams in flight, two layers of stage clouds, computer generated shadows and an expansive matte painting of Neverland island.

meetings with Steven early on, I said, ‘We must fly the camera as well as the person.’ He agreed. Sometimes the camera was suspended sixty or seventy feet in the air.”

The anticipated employment of digital wire removal technology — which had had its first significant application in *Back to the Future II* — allowed Lantieri and his crew to rig the flying harnesses with sturdy cables rather than the slender wires of flying stunts past. As a result, Robin Williams himself was able to perform most of the once risky flying stunts in perfect safety, often covering distances of one hundred feet in just seconds. “Robin was flying on three cables that could hold seven hundred pounds each,” Lantieri noted. “Since he only weighed around one hundred sixty-five pounds, we knew we were way over the requirement in terms of safety, which was our primary concern. Because CG was going to remove the cables, we could do things that were completely safe that maybe a few years ago we could not have done. So the practical flying was less restrictive on me and it was also less restrictive for the director because, since it was really Robin doing the flying, Steven could go in for close-ups whenever he wanted to.” Although the heavy cables allowed Williams to be safely flown through the air, the practical flying work still required special precautions. “We would fly between trees, tight spots, have him swoop down and come up before he hit the rocks. My flying crew had what we called ‘drop-dead marks’ on the cables. When these marks came by, no matter what we were doing, we knew we had better make the move because we were flying too close to rocks or water.”

As with the bluescreen work, the practical flying required a variety of harness rigs and setups. “We had tracks as high as ninety feet, and different flying rigs were used from shot to shot. The flying harness we used for vertical lifts was particularly uncomfortable for Robin. It was a very tight pair of bicycle shorts made out of leather or kevlar — the material used for bulletproof vests. It was laced up as tight as we could get it so that when we picked Robin up, the pull would spread the load over the entire area rather than in one spot. The harness was underneath his costume. We slit the sides of the costume and ran the cables from there.” For horizontal shots, Williams was put into a complete bodycast. “We reinforced the cast with thin steel, but it was still only about a sixteenth of an inch thick. Again, the costume fit right over the cast. We mounted the cables at three balance points on the cast — two points under the arms and another right between his legs. The cast enabled us to fly Robin flat, without it looking like he was just hanging there. We reinforced his posture to make it look normal in terms of flying. We used belly pans as much as we could; because if you just suspend someone directly with wires, no matter how you do it, his body is going to want to sag to the ground, which is a dead giveaway that he’s hanging.”

Key to the success of both the bluescreen and practical *Peter Pan* flying was the unflinching good humor of Robin Williams. “Robin was absolutely great to work with,” observed Kim Marks. “It was uncomfortable and it was, at times, dangerous — for the *Neverland* flyover shot he was hanging thirty feet in the air — but he was a trouper. Where we’d want one more take, he’d want two more.”

The digital wire removal process that had enabled the production to safely fly their star was employed after the resulting footage was digitized. For straight cables, the start and end points were plotted. The computer could then automatically sample the colors on each side of the plotted line, erasing the cable by blending in the colors on the left and the right. Wild, vibrating cables required frame-by-frame hand painting techniques. “Anytime the cable was bent or vibrating or swinging we would have to crop out the window of this high-resolution image and hand-paint each frame,” said

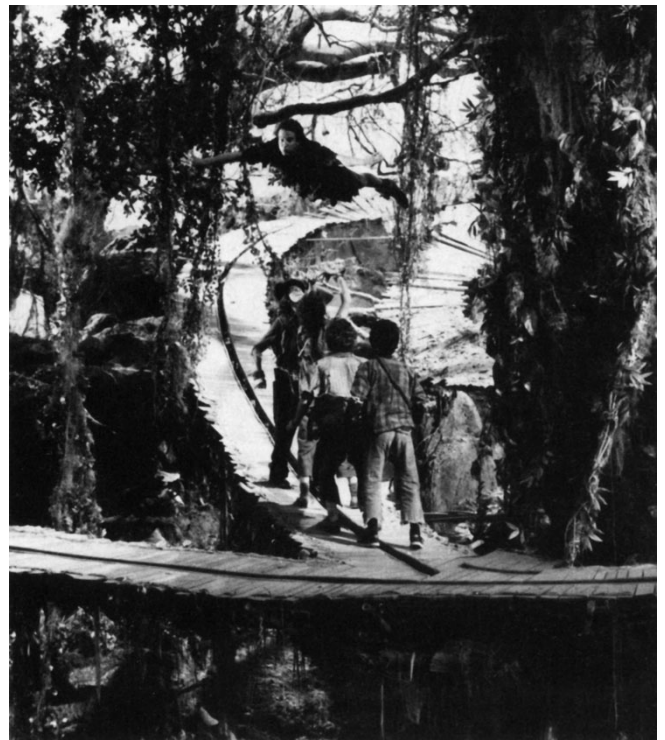
Fangmeier. “It is easy to paint a single frame, but the problem is painting consecutive frames and making it look like a continuous movement. The artistic part of it is to be consistent, without any flickering. You have to continually loop the section you’re painting, playing it back on the computer in real time to make sure it looks good. Since the wire rigs were shot on stage going across backgrounds of vegetation or pirate ships, sometimes it was difficult to see the wire unless it was in motion. If we stopped the frame, we’d lose it.” Approximately sixty wire removal shots equated to some ten thousand frames of manipulated imagery. “It required gigabytes of data — a big data processing job with an artistic aspect to it. With six people working, each shot took about two weeks to complete. We had about five work stations with six to seven shots in different stages always being pushed through at one time.”

The high-tech advances, particularly in the digital realm, allowed for the interplay of practical and visual techniques in the film’s final sequence when the children fly back from *Neverland* through Granny Wendy’s nursery window for a family reunion. Energized by the magical influence of *Neverland*, Uncle Tootles — one of the *Lost Boys* who has grown old and been under Wendy’s care — flies out of the nursery window to soar above the London skyline. The effortless passage through the window was achieved by removing a section of the ceiling and flying actor Arthur Malet through the opening on cables suspended from an overhead track. Eric Brevig, working with Michael Lantieri, shot a separate plate of the ceiling with the missing section in place. After digital work to remove the wires, the ceiling was recomposited into the shot.

The Tootles flyaway featured Granny Wendy, Peter and his family crowding the nursery room balcony and watching as the old man soars over London and twirls around stately Big Ben. The matte painting department was called upon to create the illusion, which required two overlapping paintings. The top one utilized a blowup photograph of London which enabled the artists to rearrange the historic skyline. “The reason we did two paintings was to avoid doing a painting that was forty feet wide — impossible to do in the amount of time we had,” said Mark Sullivan. “As it was, it was one of the more complicated shots we worked on. We did an extreme pullback from Peter and his family looking out the window. Then, as the camera zoomed back and tilted



To create naturalistic perspective shifts in *Peter Pan*’s overflight of *Neverland* — essentially a flat matte painting — the island rendering was scanned into a computer and texture-mapped onto a three-dimensional computer model. Matte artist Yusei Uesugi details the aerial painting used in the shot.



Interactive shots of Peter flying in and around the Nevertree and Jolly Roger sets were realized by suspending Robin Williams on thick cables attached to a variety of flying rigs mounted on a gridwork of overhead

up, there was an idealized view of London. Wendy's house was actually a ten-foot-wide matte painting, a reverse shot, as if you are somehow in midair looking down at the house. We zoomed back from this house — which had rear-projected live-action in the window — to an eight-foot-wide London painting that was physically suspended in front of the house painting, closer to the camera. The camera was tilting and panning up off the painting of Wendy's house to the front painting which was cut out so it was following the existing rooftops and architectural features of the larger painting."

An eight-foot-wide photographic print served as a basis for the painting. Overlaying paint on the London photograph enabled artist Rocco Gioffre, assisted by Yusei Uesugi, to meet the production deadline without having to spend the weeks or months necessary for a detailed skyline rendering. Armed with paint and brush, the artists added snow to the rooftops and shadows — and likewise rearranged the familiar skyline. "Spielberg didn't want to have too many modern buildings in the shot, so one of Rocco's tasks was to paint out a lot of modern buildings to create a more idealized view of London featuring its most recognizable buildings like Big Ben, Parliament and Westminster Abbey. In the photo, Big Ben was actually pretty far away; so we had to have Rocco paint Big Ben all over again, bringing it much closer in camera."

For ILM, the happy ending to *Hook* was that the company successfully completed its two-hundred-plus effects shots in near-record time. "It was clear from the start," stated Eric Brevig, "given the production deadline, that there would be no room for error. That meant that if a shot took eight weeks to do from start to finish and we had twelve weeks for the whole postproduction, we had to do it *right* and in the right order so that everything came to a conclusion in time. It was one of those high-pressure periods. *Hook* was an important show and this stuff had to look great."

As late as the last week in November, key shots — notably, Peter being lifted up to the Nevertree — were still being perfected. On November 25, the last of the effects shots were delivered — mere days before the film's December 11 opening. For many of the artists involved, the film had a magical luster that could be attributed not only to working with *Hook*'s visionary director, but also to toiling on the old MGM soundstages, so evocative of Hollywood's golden past. "It was a phenomenal feeling being down there," said Kim Nelson, "because of all the history behind it. While I was there they were just putting up the 'Sony Studios' sign — and it was kind of a sad thing to witness. I found myself thinking of all the incredible movies that were made on those stages and all the great old stars."

Upon his return from *Neverland*, Peter Banning finds himself outside in the snow beneath Granny Wendy's nursery window and exults upon awakening from his life-altering dream. It is the exultation of Scrooge awakening to find that he has not missed Christmas; it is the sweet smile of Alice's sister aware that the Wonderland Alice has returned from will provide her with abundant memories for years to come; it is the wisdom of Dorothy who stepped behind the curtain of power in the Emerald City of Oz to find that the really important thing is to have the power to go home again. As Peter discovered for all of us, the magic of *Neverland* will always be as close as a dream.

tracks. During postproduction, the cables — very safe but clearly visible — were digitally extracted from the footage. For a closing shot of footies' exuberant flight over London, a live-action plate of Peter and his family watching from Granny Wendy's nursery window was rear-projected into a ten-foot-wide painting of the house which was photographed in conjunction with a second painting encompassing the city skyline. Camera operator Brian Van't Hul lines up the shot.

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BORROWED FLESH

article by
Jody Duncan



Considering the nature of filmmaker David Cronenberg's body of work to date — *Scanners*, *Videodrome* and *The Fly*, among others — it is perhaps not surprising to learn that he counts among his early influences author William S. Burroughs who, along with Jack Kerouac and Allen Ginsberg, shaped the ideas of the Beat generation through an innovative literary style. Like Burroughs, Cronenberg has never shied away from controversial and even shocking ideas and images. Both men have, in their respective mediums, explored themes of power, sexuality and addiction. Both share a fascination with science fiction, horror, fantasy and the insect world.

It was more than a decade ago that Cronenberg first conceived the idea of making Burroughs' breakthrough book *Naked Lunch* — published in 1959 — into a movie. Straddling the line between art and pornography, and stream-of-consciousness in style, the novel was not a particularly likely candidate for a translation into film, but Cronenberg was undaunted. "Even though the book was disjointed and there was no narrative per se, I thought the imagery of *Naked Lunch* was very cinematic. It was an exciting prospect because I knew I could not do a *literal* translation of the book — it would have to be a fusion of Burroughs and myself." Cronenberg met with Burroughs in 1984 to discuss his vision of the project and secured the author's enthusiastic approval. "With his 'okay' I began to attempt this fusion of myself and Burroughs in the script. I was the fly and he was Seth Brundle and hopefully we'd come out of the telepod having created some kind of functional monster that would be the movie *Naked Lunch*."

Producer Jeremy Thomas secured the rights to the novel and Cronenberg began writing the script in earnest in 1989. While retaining many of the elements of Burroughs' original work, Cronenberg scripted a more structured narrative which centered around the character of William Lee — a character loosely based on Burroughs himself. Lee is an exterminator in New York City, circa 1953, who accidentally kills his wife and flees to the grim, cloak-and-daggeresque environs of Interzone, a place conjured up out of his own hallucinatory state. Engaged as a kind of undercover agent — but for whom or to what end, he is not sure — Lee writes a series of reports from Interzone that will ultimately become the book *Naked Lunch*. As he falls farther and farther into the mire of addiction,

Lee is guided, and sometimes bullied, by a variety of fantastic creatures, from the sinister, reptilian mugwump to a pair of insectlike writing machines.

The offbeat nature of the project made it a difficult one to mount — even with an esteemed director at the helm. “It was very hard to sell this project,” Cronenberg admitted, “because it was weird and not a typical ‘studio’ movie. You can make strong and successful movies outside the system, but it is perilous.” Twentieth Century Fox finally agreed to underwrite the film, and principal photography was slated to begin in January 1991 in Toronto.

Before the start of preproduction, more than one actor expressed interest in the project. Peter Weller, whose career had skyrocketed with the success of *RoboCop* and its sequel, was an avid fan of both Cronenberg and Burroughs, and very early on wrote to the former expressing his desire to be in the film. Roy Scheider, too, was enthusiastic about the project. Ultimately, both actors were cast — Weller as Bill Lee and Scheider as the manipulative Dr. Benway. Judy Davis in the dual role of Lee’s wife and Interzone inhabitant Joan Frost, Ian Holm as writer Tom Frost, Julian Sands as the dissolute Yves Cloquet, and Monique Mercure as the Interzone witch Fadela, rounded out the cast.

During the preproduction period, Cronenberg and production designer Carol Spier began scouting locations for the film. For both visual and sentimental reasons, they settled on Tangier — the location where Burroughs had actually written most of *Naked Lunch*. A week before filming was to commence, however, the Persian Gulf War broke out and the Morocco shoot was canceled. Over a three-day weekend, Cronenberg rewrote the script to accommodate the last-minute change. “I had about a day of being depressed when I found out we couldn’t go to Tangier,” Cronenberg admitted. “But then I realized that it wasn’t really a problem because Interzone was always meant to be a state of mind, not a literal country. It made the script clearer to have Lee stay in New York so that the whole thing was clearly a hallucination. Once I had to make that decision, the script became more solid.”

The shift from Tangier to New York meant some fast footwork for Spier, as well. Seven major sets had to be designed and built to replace the Tangier locations. “We had started off with the idea of New York looking very New York and Tangier looking very Tangier,” said Spier. “But when we found out we couldn’t go to Tangier, we had to rethink everything. We looked at all the location photographs we had taken in Tangier and tried to incorporate some of what we saw there into our New York sets. So each set has elements of both New York and Tangier.”

It was also during preproduction that Cronenberg elicited a commitment from Chris Walas *Incorporated* to produce the mechanical and makeup effects for the film. Founded by effects veteran Chris Walas, CWI had earned a solid reputation working on such projects as *Gremlins*, *Enemy Mine* and *Arachnophobia*, and had won an Oscar for its previous Cronenberg outing, *The Fly*. Intrigued by the unusual creatures in the *Naked Lunch* script, and eager to collaborate with Cronenberg once again, the effects company immediately accepted the assignment. “We were very excited by the script,” recalled Jim Isaac, longtime CWI associate and effects supervisor for *Naked Lunch*. “Most of the effects in the movie were things that had never been seen before. We took the project because it was unique; and, also because we love working with David. We had had a great time on *The Fly* and we really respect him as a director.” With a comfortable seven months before start of principal photography, the effects team — headed by Isaac and CWI general manager Mark Walas — began

designing and constructing literally hundreds of centipedes, beetles, mugwumps, talking bug typewriters and all the other strange inhabitants of Interzone which would then be trucked en masse to Toronto.



In writer-director David Cronenberg's film adaptation of Naked Lunch, protagonist Bill Lee (Peter Weller) is an exterminator who encounters a variety of bizarre creatures as he files obtuse reports from Interzone — a hallucinatory environ conjured up out of his tortured psyche and drug-disordered mind. Chris Walas Incorporated realized scores of creature effects for the film, among them the case officer bug, a six-inch-long talking beetle that confronts Lee in a police interrogation room.

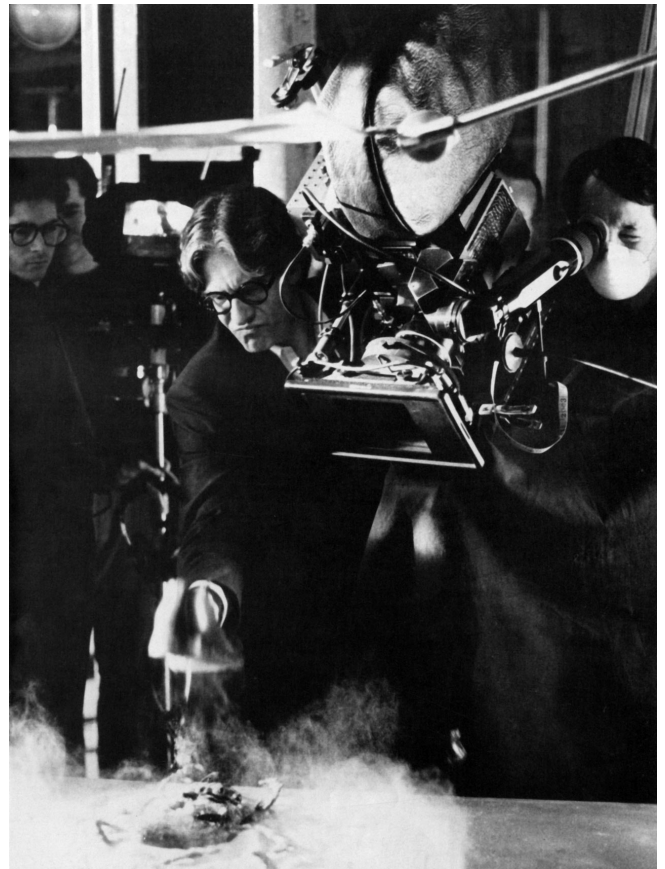
Naked Lunch begins with Lee being hauled into police headquarters where he is questioned about his apparent overuse of the poisonous yellow bug powder he employs in his work. To make him prove his claim that he uses the powder only to kill bugs, the two interrogating officers pull out a shoebox containing an enormous live beetle. When they leave the room, the insect engages Lee in conversation, speaking through a flexing sphincter on its abdomen. The beetle explains that he is Lee's case officer' and that Lee's wife is actually an agent of Interzone, Inc., and must be exterminated. Horrified, Lee surreptitiously removes his shoe and smashes the offending insect.

As with all the creatures in the film, the case officer bug went through a lengthy conceptual process. From an approved design by Chris Walas, the six-inch-long insect was refined by sculptor Harold Weed. "I sculpted it in six body sections — the main body, the sphincter, the head, the mandibles, the wings and the legs. Each part had to be sculpted and mechanized individually." Five separate beetle puppets were constructed to achieve a realistic performance from the case officer bug. "We had one that scurried across the table by itself," said Jim Isaac. "That was a motor-driven, cam-operated rig. And then there was one that had a magnet on it. By putting another magnet underneath the table where the bug sat, we were able to move the puppet around. There was also one that was fully mechanical — the legs moved, the wings opened, and it had a talking sphincter. Then we had one where we locked down the legs for closeups of it talking. That one had four-way head movement and the antennae moved on it, too."

Finally, a series of breakaway versions were sculpted by Weed for the scene in which Lee smashes the bug with his shoe. "I made thin, shell-like duplicates of the beetle out of a very brittle urethane plastic. We airbrushed the inside so that once it shattered, any inside pieces that showed would look like flesh and veins and so forth. We experimented with different



In addition to head and extremities articulation, the beetle was required to speak through a sphincter-like orifice in its abdomen. Five separate beetles — each with different capabilities — were utilized to achieve the performance.



kinds of ‘guts’ for it — tapioca and butterscotch pudding and different consistencies of methocel that were tinted either with acrylic paint or food coloring. We put the goop in sealed bags and then stuffed those bags inside the body. David smashed it in closeup — and when he did, stuff flew everywhere.”

Wary of the grotesque creature, Lee smashes it with his shoe. For the scene, a number of beetles were cast out of brittle urethane plastic and filled with a gooey mixture of puddings and other substances. Cronenberg handles the bug-smashing honors as director of photography Peter Suschitzky records the action in closeup.

Fleeing police headquarters, Lee seeks out Dr. Benway who has been recommended to him as someone who can help cure his wife of her bug powder addiction. Benway prescribes the meat of the giant aquatic Brazilian centipede — a black powder which is to be cut into the lethal yellow powder and, in theory, gradually diminish Joan’s addiction. Later at home, after shooting up some of the black powder himself, Lee accidentally kills Joan in a bizarre ‘William Tell’ ritual. Horrified by what he has done, Lee escapes to a secluded bar. There he encounters the mugwump — a sinister-looking, yet strangely benign Interzone agent which, through a protruding cranial organ, emits a powerfully addicting fluid.

Though many of the *Naked Lunch* creatures were products of Cronenberg’s fertile imagination, the mugwump had been featured in Burroughs’ original novel. “Burroughs talks about the mugwump in the book as a demure beast,” said Cronenberg. “I think that it represents all of the seductive monsters we run into that have some kind of addictive element — whether it is money or power or sex or whatever.” Relying on sketchy descriptions in the book and his own instincts, Cronenberg envisioned the mugwump as a tall, lanky, reptilian creature. “I thought his body should be like that of an old junkie — emaciated and with the ‘look of borrowed flesh’ that Burroughs describes in the book. I also wanted the mugwump to be basically humanoid, but with characteristics that would emphasize its nonhumanness.” It was apparent to Cronenberg from the beginning that an actor in a suit would not suffice for the abnormally proportioned creature and that a sophisticated mechanical puppet would have to be produced. “Any kind of suit would have been too bulky. And I’ve already done my ‘human in a suit’ movie — *The Fly*.”

Keeping Cronenberg’s directives in mind, designer Stephan Dupuis and technical advisor Jon Berg did a series of sketches of the mugwump. In addition, Walas — who subsequently left the project to direct *The Vagrant* — created a number of mugwump sculptures. Their designs mirrored Cronenberg’s vision exactly. “We pretty much nailed the mugwump from the beginning,” noted Isaac. “David wanted something that was very powerful and had a strong presence on the screen — not a monster, but a person. He also wanted him to have William Burroughs qualities. So we got some old photos of Burroughs and played around with those and eventually we sculpted the jaw of the mugwump to look like Burroughs’ jaw. Aside from that, it had black lips and a black beak and a tongue that was round as opposed to flat — like a parrot’s tongue. Its body was very spindly, with long arms and long legs. We also gave it a lizardlike coloring with a lot of veining underneath and very pasty-looking skin — David likes that unhealthy look in his characters. We built a foot-tall maquette and showed that to him, and he said: ‘That’s it. That’s the mugwump.’”

Of particular concern during the design phase was the phallic-like organ which was to grow from the mugwump’s body. In the first drafts of the script, the politely dubbed ‘teat’ protruded from the creature’s stomach so that those addicted to its milky secretions had to kneel in front of the beast

to suck from the organ. “It was very sexual,” noted Isaac. “There was no getting around it. We really tried to make the teats do what they had to do for the movie, but not so blatantly that David would be trapped by it. We shaped them as little like phalluses as possible — but it was tricky. David would come in to see our tests and say, ‘Oh, man, how am I going to get a rating on this movie?’ And we were saying, ‘Well, David, that was our question from day one.’”

In an effort to desexualize the image somewhat, Cronenberg eventually opted to place the protrusions in a crest on top of the creature’s head rather than on its stomach. “The idea of the teat on the head made sense in terms of the story,” Isaac asserted. “The mugwump was supposed to be almost worshiped. With the teat on his head, he could bend down — like a king extending his ringed hand to be kissed — and as the characters sucked, it was as if they were worshiping this creature. We also realized that having just one teat on the head might look silly, so we came up with the idea of placing several sea-anemone-type organs in the crest and having this teat grow out from among them.”



A wizened mugwump engages Lee in conversation. Head articulation was achieved via cables that ran through the body and into the floor of the set — which was elevated six feet off the stage to accommodate the dozen or more operators needed to make the puppet perform. A T-pole rig which likewise exited through the bottom of the puppet provided gross body movements.



Late in the film, Lee discovers the mugwump dispensary where dozens of the creatures are trussed up to afford easy access to their drug-secreting cranial organs. More than fifty nonarticulated mugwumps were supplied for the sequence.

Although only two mechanized versions would be built — and only one fully mechanical ‘hero’ version — more than fifty of the six-and-a-half-foot-tall mugwumps had to be constructed altogether. Most would require only simple wood or wire armatures, but the sheer volume alone represented a major undertaking for the CWI fabrication department. Foam latex skins were produced en masse in molds made from a highly detailed sculpture of the mugwump. “We were very careful with the first mold to get all the detail and the fit right,” said mold supervisor Wim Van Thillo. “The master mold was made in about twenty-five separate pieces because the mugwump was such an odd shape. We injected silicone in a stone case for the master mold, then we took one good copy and made five additional two-piece fiberglass molds from it. After that, it was a simple matter of painting in latex and foaming them up, five at a time. It took only about ten or fifteen minutes for the foam to set up, so it was a quick approach.”

For the hero mugwump, the foam latex skin was supported by a fiberglass understructure into which the various mechanisms that would articulate the beast were mounted. Requiring up to fifteen puppeteers to operate, the completed hero puppet featured a number of cable controlled facial articulations, including four-way eye movement, upper and lower lips that could move either in tandem or independently, and four-way tongue movement. The tongue proved to be one of the most challenging aspects of the mechanizing process. “We were asked to build a tongue that would be able to extend about seven inches out of his head and be totally movable,” noted mechanical supervisor Kelly Lepkowski. “But for it to move out seven inches, there had to be seven inches of blank space behind it for it to go back into. We ended up putting the tongue on the end of a flex shaft — and that is what pushed it in and out of the mouth.” Air bladders placed around the eyes and in the cheek areas could be inflated and deflated to provide more animation in the face.

The mouth and tongue areas had to be especially well mechanized since the puppet would be required to speak dialogue. “He had a great deal of dialogue,” Lepkowski commented, “which is very unusual for an effects creature. We had to concentrate on the lips and make sure that we had some really good lip movement, along with simple up-and-down jaw movement, to get something that would read as speech. The beak-shaped mouth allowed us to get a lot of variation in the lips just by putting two cables in the top lip and two in the bottom. Each one of those cables was on a separate lever and the two levers were joined together with a bar. By pulling that bar, we could make both sides of the lips move in the same way.”



Required to speak pages of dialogue, a fully-mechanical hero mugwump was equipped with four-way tongue movement and cable-controlled lips to achieve realistic lip-sync action. Effects supervisor Jim Isaac prepares the puppet for a shot in the bar.

Animatronics engineer Bryan Dewe was responsible for articulating the mugwump lips for all of the lip-syncing scenes. “I spent about four weeks rehearsing the lip-syncing. I got a tape of someone reading the lines and I practiced and practiced with that. When I felt as if I was getting close, I videotaped it to see what was working and what was not. The ‘P’s and ‘B’s were the hardest sounds to make.”

The neck of the puppet was equipped with a series of pulleys and joints that enabled it to both twist and tilt from side to side. “The neck was very complex,” noted Lepkowski. “It had five axes of movement on it. It turned back and forth at the base, with the head turning in sync with it; and the head also tilted, in addition to rotating. We used a ‘three-way’ for the neck — a universal joint pulled with three cables. The neck came out almost perpendicular to the body; so the head, instead of being on top of the body, stuck out like it was on a stalk. It was very difficult to get organic movement from something like that.”

“David really liked how that looked,” Isaac added, “but from a mechanical standpoint, it was a nightmare. The head was a good two feet from the shoulders, so we had to use very long cables to operate it. The cables ran down through the body and then underneath the set. Generally, the longer the cable, the more difficult it is to operate the puppet — and we had cables that were up to fifteen feet long in some scenes. One person would operate the head turn — which was a compound move — and then another person would operate the head tilt.”

In addition to the head and facial articulations, body movements were incorporated into the puppet by way of a pole which ran the length of its body and extended out through the bottom. “There was a T-handle at the bottom — like a submarine periscope — and we could twist it so the puppet pivoted at the butt, or we could twist it so the shoulders would twist alone. One person would do those two moves to keep the puppet alive. The body was all jointed so that the legs could move even though the puppet couldn’t walk. To simulate breathing, a tube was connected to the chest which had big balloon bladders in it. Someone below would keep that going with a foot pump.”

The mugwump construction was halfway complete when Cronenberg decided that all of the organs in the cranial crest should be moving rather than remain stationary as originally conceived. “He wanted them to move in a fluid motion, very organically, all of them in a different sequence,” Lepkowski noted. “It was difficult because they were on a head that was mechanized through this very thin neck. Obviously, we couldn’t have forty cables going through that small a space. So we put a miniature cam controller device inside the head to pull the independent cables. It was driven externally by a motor that was fitted in the mugwump’s body. We couldn’t have a motor in the head because it was sitting on the end of this two-foot-long neck and every ounce of weight that we put on the end of that translated to ten pounds to the cable in the back that was trying to lift it. So we ran a flex shaft up there and built a really lightweight cam mechanism that drove all the organisms in the crest.” The motor that drove the cam controller was hooked up to a rheostat so that the rate of speed of the moving organisms could be adjusted according to the director’s wishes.

In addition to the smaller moving organs, the crest was equipped with an extending latex teat. “The growing teat had us guessing for quite a while,” admitted Lepkowski. “Because it didn’t have any seams, we couldn’t do the typical thing with a fold that it could grow out of. David wanted to see it blend very evenly into the top of the head and then grow to two or three times its length. It was asking a lot.” Lepkowski finally arrived at the idea of using air pressure to produce the growing effect. The major difficulty was finding a material that would expand properly. “One of the problems we had in the early tests was that materials would balloon out rather than growing lengthwise. I ended up using nylon that was like parachute material. It was very lightweight, finely woven cloth which was slick and moved easily against itself. I sewed that into the right shape and covered it with eighth-inch-thick foam latex. We built up a nipple on the end and then painted some veining on it. There were no molds, so each teat had to be built individually.”

Adding to the challenge was the fact that, once extended to its full length, the teat had to emit fluid. An eighth-inch nylon tube was affixed to the tip of the organ and run down its length. “The tube actually served two purposes,” noted Lepkowski. “One was to hold the teat in place and let it out slowly. If there had been nothing to hold it, once the air pressure was turned on, the lightweight material would have shot out too fast. The tube was also used to pump the fluid through. Someone would push a syringe-full of this stuff as hard as they could to get it through that small passageway.” The composition of the fluid varied depending on the nature of the scene in which it was used. “If it was a shot where a character had to actually drink the fluid,” explained Isaac, “we made up a mixture of milk and honey and egg white. For shots of it just dripping out of the teat, we used colored methocel and egg white. Right before the shot, we would dress the tip with ultraslime.” Other final dressing touches — which primarily fell to Isaac and crew member Carol



*Having displayed a fascination with insects in previous projects, Cronenberg incorporated into his *Naked Lunch* script a pair of insect-typewriters capable of movement and speech. One, the Clark-Nova, serves as confidant and mentor for Lee in his undercover activities in Interzone.*



Cyclical leg motion for the walking insect-typewriters was achieved via cable mechanisms and cam devices that CWI originally devised for another project. Animatronics

Bauman — included greasing the overall creature with K-Y jelly and moistening its eyes.

technician Harold Weed installs articulation mechanisms like the case officer bug, the Clark Nova was equipped with a talking spinner. Thirteen puppets were ultimately constructed to perform all of its required actions which included scurrying across the floor, jumping off a desk and assaulting a perceived rival.

Because of the numerous cables extending from the puppet and the number of puppeteers required to operate it, the special effects team had interacted with the art department early on regarding their specific set requirements. The waterfront bar, which was the setting for Lee's first encounter with the mugwump, was constructed on six-foot risers to accommodate the puppeteers below. Specific set pieces were also fabricated to fit the effects team's needs. "We talked with them about designing a stool for him to sit on that would not expose all of the cables and the center rod that supported his body," said Lepkowski. "Also, there had to be a large enough hole to allow for the slight side-to-side motion of the mugwump as he sat on the stool."

Throughout the bar scene, the creature smokes and engages Lee in conversation. The most challenging aspect of the *Naked Lunch* project, from a creature effects point of view, was the pages and pages of dialogue which demanded extensive lip-syncing from the mechanical artifact. "We had to find a way to coordinate the lip syncing and the puppeteering and the performances once we got on the set," Isaac noted. "If we had just had our puppeteers read the lines, that could have been distracting to Peter Weller because our people are not actors and they would most likely not do justice to them. So David auditioned actors and hired one to read all of our characters' lines in the proper rhythm and cadence. Then we taped that and rehearsed our puppeteering with it. On the set, the actor was miked so that our puppeteers below could hear him — and Peter could hear him live. So Peter had a real voice to play off of while the puppet was mouthing the words."

Because the hero mugwump arms were not mechanical — their slight movement was achieved by attaching monofilament to the elbows and marionetting them off-camera — the shots of the mugwump smoking were achieved with articulated, but unattached closeup arms positioned at the correct angles from the puppet's body while the attached arms hung at its sides. The closeup arms were equipped with movable, jointed fingers and wrists that could twist as well as move up and down. Two puppeteers were required to operate each arm.

For the smoking effect, a fake cigarette — constructed by Guy Hudson and Joel Friesch — was glued to the puppet's fingers. "We had a small cable wire that went through the hand and all the way down to the middle of the arm and then out the end where the other cables were coming out," explained Isaac. "The glowing cigarette tip was the kind of light used on miniature trains. It was on a rheostat so we could make it brighter or dimmer. The trick in the puppeteering was to get the timing right because we had the cheek bladders going and the cigarette had to come up to the mouth and the lips had to move a little bit to accept the cigarette. The cigarette didn't actually go into the lips, but the hand covered the mouth to hide that. We had a five-gallon drum underneath that was full of smoke produced by burning raspberry leaves in the drum. And we had a pump that would suck the smoke out of the drum and blow it through a tube and out the puppet's mouth. There were two separate tubes so that the smoke could come out of his mouth or his nose, depending on the shot." Eventually, the crew found that it was simpler and more expedient to bypass the smoking device altogether and just have someone blow real cigarette smoke directly through the tube while watching the scene on a monitor for timing purposes. Smoke curling up

from the end of the cigarette was simulated by applying drops of A-B smoke — a two-part reactive chemical that, when combined, creates a noxious vapor — just prior to shooting.

Later in the film, the mugwump appears to Lee in his seedy Interzone hotel room. The hero puppet was again employed, this time with the T-handle pole rig coming out through a chair and into the floor where the puppeteers were stationed. Again, early consultation with the art department helped to hide both the rig and the puppeteers. “The mugwump was sitting on a chair behind a table,” stated Lepkowski. “Obviously, if it had been a standard desk or table, we would have had a lot of limitations. But the art department worked with us and came up with a chest with a board on top of it for Lee’s table. Because it was solid, it allowed us to have operators underneath and cables coming out, without having to worry about hiding them. It wasn’t as complicated as the bar scene — the mugwump didn’t have to smoke or any of that stuff. So we were able to deal with it with puppeteers lying down on the floor or hunched behind the table.”

A less sophisticated ‘bend-over’ puppet was designed by Guy Hudson and used for specific scenes in which the mugwump bends down to offer the teat upon its head. “Its main function was to bend over,” said Isaac, “and it had a functional, growing teat. We found that it was also useful for other specific shots because it had a steel frame and, unlike the hero mugwump, could stand on its own.”

Finally, fifty nonarticulated dummies were built for a scene towards the end of the film in which Lee discovers the mugwump dispensary — a barnlike warehouse in which dozens of mugwumps are trussed up and hung upside down, making their fluid-emitting organs easily accessible to addicted slaves. The fifty mugwumps were divided into three groupings depending on the quality of their skins. “The best ones were placed nearest the camera,” Isaac explained, “and the less desirable ones were put in the back. Then, for closer shots, we had two mechanical mugwumps with teats that actually dripped. There were no facial movements or anything on those. We did armature a few of them — some with steel, some with wood — so that we could pose them. Since they were all harnessed, there was only limited movement we could get from them anyway. We also used our bend-over mugwump for a shot in which one of the characters is sucking the teat and talking to Bill. Because it was a closeup and the mugwump was supposed to be alive, there was a fair amount of head movement. We didn’t have time to build a whole new puppet from scratch, so we just flipped our bend-over guy upside down and hung him on a special rig so we could put him in any stall we wanted.”

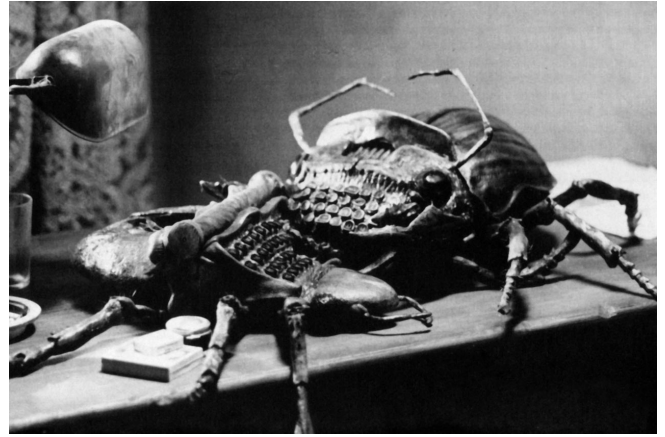
In the bar, the mugwump enlists Lee as an agent, presenting him with a tourist class ticket to Interzone and recommending that he write his reports on a Clark-Nova typewriter because of its ‘mythic resonance.’ Before departing for Interzone, Lee acts on the mugwump’s suggestion and trades in his gun for an old, portable Clark-Nova. Once settled into his Interzone hotel room, Lee begins to perceive his acquisition as a talking beetle with a keyboard face. The insect typewriters indigenous to Interzone were purely cinematic inventions. No such things existed in the Burroughs book. “The insect typewriters were my trick to get the audience inside the writing experience,” said Cronenberg, “where your writing machine and your experience of writing and the characters that you are writing all blend together into one. Also, Burroughs uses insect imagery a lot, and I’ve always been fascinated with the insect world.”

The Clark-Nova is the most prominently featured insect typewriter in the film — a CIA-type operative who guides Lee as he struggles to complete his reports from Interzone. In Cronenberg's mind, the Clark-Nova was a kind of tragic hero. "He's a good guy — or at least as close to a good guy as you're going to get in Interzone. So Clark-Nova had to have some charm, which made his design somewhat difficult. We went through a lot of debate over this guy. How big should he be and how much expression should he have? How much could we rely on real insect anatomy and still get something that would work dramatically? There was a lot of trial and error before we came up with a successful design."

Clark-Nova eventually evolved into something resembling an old-style office typewriter curiously incorporated into an exoskeleton of organic insect elements. "David knows what bugs look like," noted Isaac, "so we really had to do our research to make this thing look real. It had mandibles in the front that were like claws, and then legs that were more beetle-like. The front was flat-faced with a keyboard and the wings came up from that. In the back — which is where the body would be — was a talking sphincter like the one on the case officer bug."

Crew member Randy Ottenberg began sculpting the Clark-Nova. When he had to leave the project, however, Harold Weed stepped in to finish the work, aided by Stephan Dupuis and Joel Friesch. "When Randy left, there was a big push on the Clark-Nova," said Weed. "I sculpted the wings and the legs and most of the head. Joel sculpted the mandibles — over and over again. For some reason, they were always being changed. Even after we started to mold the head and make pieces, the mandibles got changed three or four times."

Mechanizing the puppet was simplified somewhat by the fact that the CWI team had just come off another insect movie. "Luckily," noted Lepkowski, "we had had time on *Arachnophobia* to develop devices that would allow us to make insect movements. We had built cam devices that pulled cables in a sequence to get the repeating motion of a spider's walk. So the technology we developed there made it easier for us to build the insects for *Naked Lunch*."



The Martinelli insect-typewriter — loaned to Lee by fellow Interzone writer Tom Frost — was designed as a sort of feminine version of the Clark-Nova. Convinced that the Martinelli is an enemy agent, the Clark-Nova attacks the rival typewriter, chasing it across Lee's hotel room floor and finally devouring it. For the chase, the mechanized Martinelli was fitted with a rod that protruded from the underside of its body, enabling it to be puppeteered through slots in the elevated floor of the set



To impart an organic look, methocel and K-Y jelly were routinely applied to the foam latex creatures just prior to filming. Jim Isaac does a final dressing of the Clark-Nova and Martinelli puppets on the set.

In the course of the film, the wise-cracking Clark-Nova dives off Lee's desk, runs frenetically around the room and devours a fellow insect typewriter. Thirteen puppets were required to perform all of its numerous actions. For closeup talking scenes, two hero puppets were constructed. "One was a rod puppet that we used for closeups of the head," said Isaac. "The jaw, wings, mandibles and antennae were all capable of movement. Since the same puppet was needed for shots of the Clark-Nova scurrying across Lee's desk, it also had mechanical legs operated on a cam controller. Then, for the talking sphincter in the back end, we had a second hero Clark-Nova that was a hand puppet. On that one, the front legs moved up and down and side to side, but the back legs were tied down. The head section of that one was also operated by hand — a puppeteer would put his hand inside, hold the jaw and move it up and down."

As he had for the mugwump, Bryan Dewe performed the lip-syncing for the Clark-Nova puppet. "Because there was no armature in this particular rig, we glued little finger cups inside to give the sphincter more definition. We had started out with an armature built into it; but David didn't really like the way it moved, so we took the armatures out and started to do the hand technique — which worked fine. We cut a hole in the floor and I would stand underneath the desk. My arms would get tired, holding them up over my head all day, but David was really good about letting me rest. There was a monitor there to watch while I was puppeteering. I would read the lines on the page while the actor on stage was reading them aloud and then glance at the monitor from time to time to see how I was doing."

In addition to the two hero rigs, a 'pull-toy' puppet was constructed by Jamie Hyneman for scenes depicting the Clark-Nova scuttling across the floor. The rig was set up on wheels; and as it was pulled, the legs would rotate in sequence. "It was really a frantic motion," Lepkowski noted, "so it didn't have to be that controlled. In one scene it had to slam into a door, so that puppet was built like a tank. It had huge aluminum girders in it and the head was solid fiberglass with big bumpers all along the front. We used the mandibles themselves, cast out of urethane rubber, to absorb the shock."

Yet another Clark-Nova puppet was the 'flailer.' "It had a battery-powered motor inside — like a Makita power drill — that moved off-center and made the whole puppet flail and shake," said Isaac. "We used it for quick wide shots. It was self-contained — we'd just turn on the switch and it would go." For a shot of the Clark-Nova leaping off Lee's desk, the crew had originally tried using the simple flailer rig, running a line to it and pulling it off the desk from off-camera. The approach proved unsuccessful. "The trouble was that all the other rigs looked so good that we couldn't quite get away with the flailer for that one shot. So instead we designed a shot where our hero puppet jumped off the table with the wings and everything moving — it dove right off and left frame. Then, hidden underneath was our runner puppet which would take off. So you see one dive off and then a split second later you see the other one running."

The Clark-Nova is not the only insect typewriter Bill Lee has to contend with. At a party, Lee meets Tom and Joan Frost — fellow writers and suspected agents of Interzone, Inc. At Tom's urging, Lee borrows his Martinelli typewriter and takes it home. Once there — out of his precious black powder and suffering severe withdrawal symptoms — Lee suddenly hears a terrible, high-pitched screaming. *Investigating*, he discovers the Clark-Nova attacking the Martinelli on his desk. The

Martinelli jumps from the desk in an attempt to escape; however, the Clark-Nova dives on top of its hapless rival, follows as it crawls along the floor and then devours it. Because it required articulation of two major puppets, the sequence was one of the most complicated mechanical effects scenes in the film.

The Martinelli was designed by Harold Weed as a streamline, almost feminine version of the Clark-Nova insect typewriter. “It was originally drawn to be much more mechanical,” said Weed. “Chris had done a sketch early on and the legs were very squarish and the body was angular — almost like a robot version of some insect. But in the end, David decided that it should integrate more with the other designs. The Martinelli turned out to be the most complex of any of the bugs.”

Three versions of the Martinelli were constructed. A breakaway version was used for its actual jump off the table. The script had specified that the typewriter come apart as it landed — ‘like a mechanical watermelon hitting the ground.’ “We made a rig that was like one of those old spring-loaded cars that crack up,” said Isaac, “the kind that hit and then fly apart. That particular rig was loaded with different flesh and mechanical pieces so that when it hit they went all over the place.”

For the Martinelli’s subsequent dash across the floor to escape the Clark-Nova, a fully-mechanized hero version was used. “The hero had cam-controlled legs and cable-controlled head movement,” said Isaac. “It also had two sets of wings — one that was mechanical and moved up and down, and another that was meant to be ripped off during the fight.”

The hero version was also fitted with breakaway areas that would simulate rippedaway flesh from the Clark-Nova’s bites. Sections of foam latex were cut out, dressed with hot-pour vinyl to create a stringy, slimy interior, and then lightly adhered back into place. Ultrathin wings were made for shots of the Clark-Nova biting and crushing the Martinelli’s wings.

Up to fifteen puppeteers were required to realize the difficult sequence. “It was very complicated,” Isaac stated. “We actually shot the whole thing on the set. We blocked out the scene, figured out where the puppets should move on the floor and then slotted the floor accordingly. The Martinelli had to travel something like two-and-a-half feet. There was a bar down the middle of its body and we moved that bar



The suppressed passion between Bill Lee and Joan Frost (Judy Davis) is personified in a tentacled blob of pulsating flesh featuring both male and female sex organs. In its original state, the ‘sex blob’ was an exotic Arabic typewriter which transformed in two stages via bulging air bladders fitted around a foam latex replica of the typewriter and a phallic appendage that grew to nearly three feet in length.



When his Clark-Nova is confiscated by Tom Frost, Lee is compensated with the Mugwriter — an organic typing machine equipped with a mouth large enough to accommodate the writer’s hands as he typed on the keys inside. Because the oversized mouth did not lend itself to accurate lip-syncing, however, dialogue scenes originally

through the slots in the floor. A rug helped hide the track — when the Martinelli traveled, it pulled the rug along with it.”

slated for the Mugwriter were reconceived and performed by the full-size hero mugwump puppet

Having disposed of the ‘enemy agent,’ the Clark-Nova orders Lee to seduce Joan Frost. Lee visits Joan at her Interzone flat. While there, Joan types erotic Arabic words on her husband’s exotic ‘Mujahaddin’ typewriter. As Lee and Joan lose themselves in passionate abandon, the Mujahaddin transforms into an amorphous blob of quivering, pulsating flesh. Here, again, Cronenberg employed a typewriter as a device with which to make a story point. “In a sense,” said Cronenberg, “the sex blob is another metaphorical trick. *Instead* of Joan and Lee being sexy, this blob is sexy. It is general lust incarnate in a twenty-five pound package that flops around the room. It wasn’t in Burroughs’ literature, but I think it’s a Burroughsian concept.”

Long before a suitably exotic-looking typewriter could be found, Chris Walas designed the last stage of the typewriter-to-sex-blob transformation based on information he had gleaned in conversations with Cronenberg. “He spent a couple of days building a maquette that was about a foot long,” said Isaac, “and David really liked it. Then it was up to us to figure out the transformation, stage to stage, from the original typewriter to what Chris had designed.” Because an appropriate Arabic typewriter could not be located, the art department settled on modifying an eccentric English typewriter that had been used in the field during World War I. Though the sex blob design had been based on a very different Arabic machine, the effects team, remarkably, was able to mold and shape their first-stage blob into something that looked very much like the English typewriter that was ultimately used.

The transformation begins with the keyboard of the typewriter flipping around, exposing fleshy, breastlike organs. Made out of foam latex, the first stage typewriter-blob had bladders fitted at the top. “We could suck those bladders in with a suction mechanism,” stated Isaac, “and then expand them so that the fleshy part would balloon out and start to pulse. We also had bladders around the entire rim of the typewriter so that it would bulge and begin to change shape. Then, in the back, there was a phallic appendage that grew between the two ‘cheeks’ of the typewriter. It was basically a half-man, half-woman sex blob. It had all the right organs for both.” Because of the expanding nature of the rig, painter Gregg Olsson had to experiment with paints that would not lose their integrity as the foam latex stretched. “We had to create a surface on the skin of the blob that would read as metal but would expand with bladder work,” said Olsson. “We ended up using a combination of real keys and some metal chrome tape on the edges, but most of it had to be soft to accommodate the bladders.”

The second stage revealed the typewriter further transformed. The flesh-colored blob featured many long tentacles with typewriter keys at their ends, buttocks-like cheeks, and a phallic appendage which, in its final stage, was almost three feet in length. Once fully transformed, the sex blob leaps from the desk and onto the passionate couple on the floor. Fadela — the Frost’s malevolent housekeeper who controls Joan through witchcraft — enters to find the three writhing beings on the floor. Enraged, she brandishes her whip, beating the sex blob out onto the balcony where it finally jumps. Three final-stage blob rigs were constructed to realize the sequence. “We had one that jumped,” said Isaac, “and then another that traveled across the floor as Fadela chased it with the whip. It was self-contained and motorized; we could turn it on by radio control to control

its speed. We also got a lot of good movement out of it just by pulling it with wires. Then we had a third one that was a hand puppet with cam-controlled appendages that flailed around.”

Shortly after the Mujahaddin’s demise, Tom Frost arrives, demanding the return of his Martinelli. Neglecting to tell him that it has been devoured by the Clark-Nova, Lee and Joan leave the flat, supposedly to retrieve the typewriter. On the streets of Interzone, Joan points out the witch Fadela and her coven. Explaining that she must do penance for her shameful behavior, Joan joins Fadela, who is carefully slicing up a giant centipede. A variety of centipedes were featured throughout the film and were the most straightforward of the insect effects created by CWI. In all, forty foam latex dummy centipedes — ranging from two to six feet in length — were constructed. “We had bug parts everywhere,” said fabrication supervisor Carol Bauman. “We couldn’t keep them straight. We had thousands of centipede legs in boxes.” Though none of the centipedes were mechanical, two were specifically fabricated and dressed for slicing up. “On those, the sections Fadela sliced were made of hot-pour vinyl and the insides were filled with ultraslime. It was very easy to cut into — like hard jello.”

Lee returns home to type a report on his Clark-Nova. Tom Frost enters with a gun and, finding his beloved Martinelli in pieces, confiscates Lee’s protesting Clark-Nova. In enemy hands, the Clark-Nova is beaten and tortured. By the time Lee is able to reclaim him, the little typewriter operative is dying. Lying in Lee’s arms, the Clark-Nova expires as his green-colored life’s blood oozes from his battered body. A minimally articulated puppet was constructed for the scene. “It was filled with bladders and tubes that had all kinds of green goop inside,” said Isaac. “It took nine people to operate that rig. We also modified a puppet to be used in shots of him after he dies. We took the head off and the sphincter section and resculpted them with slash marks and the eyes punched out.”

After a visit from his writer friends, Lee — now completely out of black powder — collapses, crying, in an Interzone alleyway. He is discovered by Kiki (Joseph Scorsiani), a young homosexual Interzone local who assures him that the useless pieces of the Martinelli can be repaired. Kiki leads Lee to a foundry where the metallic pieces are thrown into a large furnace. Out of the furnace comes Lee’s new typewriter — the Mugwriter.

Described in the script as ‘a half-organic, half-mechanical mugwump head,’ the Mugwriter was to come equipped with typewriter keys inside its gaping mouth and the mugwump’s fluid-emitting organ atop its head. In the earliest stages of its design, CWI came up with a variety of outlandish manifestations of the Mugwriter. “We designed very strange looking heads with keyboards and rollers,” said Isaac. “Some were organic looking and some were more mechanical. One thing that David knew was that he wanted Lee’s hands to be able to fit inside the mouth as he typed — the rest was up to us. So we came up with some wild stuff. But the more we played with it, the sillier it started to look; and eventually we went back to the mugwump head. In the story, the Mugwriter is basically the mugwump, just appearing at a different level.”

Although the Mugwriter was mechanized in essentially the same way as the mugwump head, it was equipped with a much larger mouth to accommodate Lee’s hands as he reached inside to type. However, tests conducted to explore the lip-syncing capability of the wide-mouthed creature — which had pages of dialogue to deliver — convinced the effects team to design a second, smaller

mouth for use in the talking scenes. “The wide mouth just looked too silly when it talked,” Isaac commented. “And we figured, since it was a hallucination anyway, that the Mugwriter could transform itself in the course of the scene. David and I brainstormed and came up with the idea of reducing the size of the mouth when it talked and then, ultimately, replacing it with a full mugwump in the scene. That way, we were able to have the mugwump, rather than the Mugwriter, deliver ninety percent of the lines.”



Lee discovers his young friend Kiki (Joseph Scorsiani) and the wealthy, but decadent, Yves Cloquet (Julian Sands) locked in a gruesome embrace. To impart the impression of an insect feeding on its prey, Cloquet was to be shown partially metamorphosed into a giant centipede. Full-sized mechanical replicas of both characters were constructed for the effect.

Unlike the mugwump, the Mugwriter was mechanized with hand-cranked cam controllers to operate the undulating teats on top of its head. “We didn’t need motors because, since it was only a head as opposed to an entire body, we could easily bring cables out through the bottom and they would only have to be about four feet long. The Mugwriter had the same four-way eye movement as the mugwump. On the wide-mouthed version, the lips moved independently and the mouth opened and closed. For the talking scenes, we would just remove the wide mouth and replace it with the smaller mouth by cutting into the jaw area and then gluing the face back on like a prosthetic.” Six operators were required to articulate the Mugwriter.

In its mugwump form, Lee’s new ‘controller’ typewriter orders him to seduce Yves Cloquet, a wealthy but unsavory character who has inside information regarding Interzone’s mysterious leader. Lee and Kiki drive with Cloquet to his lavish house. While there, Cloquet urges Kiki to go with him to his bedroom to ‘see his parrots.’ At Lee’s request, the reluctant Kiki goes with Cloquet. Later, when Lee goes looking for the young man, he discovers Kiki and Cloquet in a giant bird cage, locked together in some kind of gruesome, life-draining embrace. As conceived, the scene was to reveal Cloquet literally devouring, in insect fashion, the younger man. In their research for *Arachnophobia*, the CWI team had been fascinated by the spectacle of large spiders eating small mice, slowly and seductively sucking the juices and removing the skins of their victims. “When we described it to David,” Isaac said, “he really liked the idea of incorporating that same feeling into the scene. It was sexual and horrific at the same time.”

Deemed too complicated to be achieved with makeup, the sequence utilized full-sized mechanical replicas of Kiki and Cloquet. “We spent a fair amount of time doing drawings,” stated Isaac. “It was a difficult look to capture and we went through a real evolutionary process. We brainstormed for a couple



Creature designer Stephan Dupuis at work on the centipede sculpture with associates Valerie Sofranko and Harold Weed.

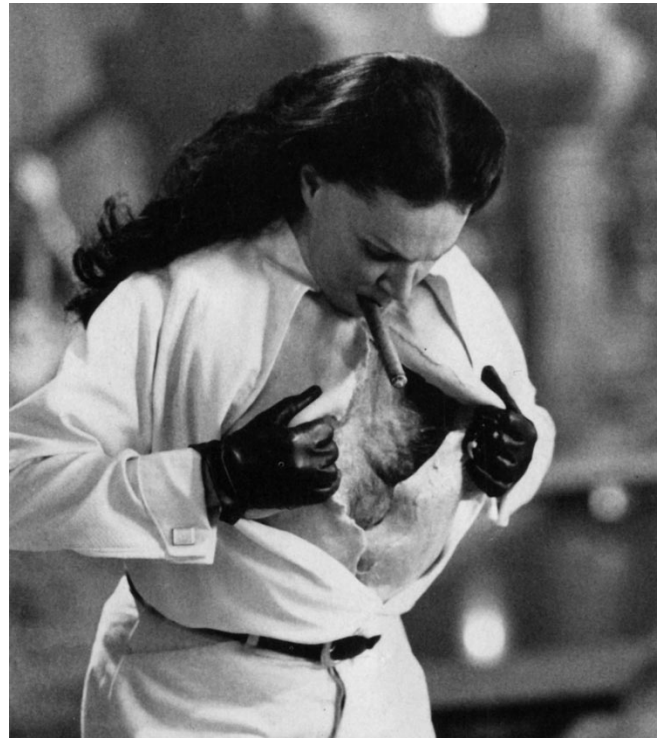


To suggest disintegrating flesh, sections of the Kiki underskull were carved away so that the outer skin — inflated at first to preserve its natural configuration — could be drawn into the underlying crevices by applying suction. Mechanical supervisor Kelly Lepkowski connects

of weeks and David finally decided he wanted Cloquet to look as though he was transforming into a centipede — although his face was still recognizable as the actor Julian Sands.”

the Kiki and Cloquet puppets with armature wire protruding from one of the centipede's spindly limbs. Monique Mercure stands suspended within the apparatus to an upended mugwump.

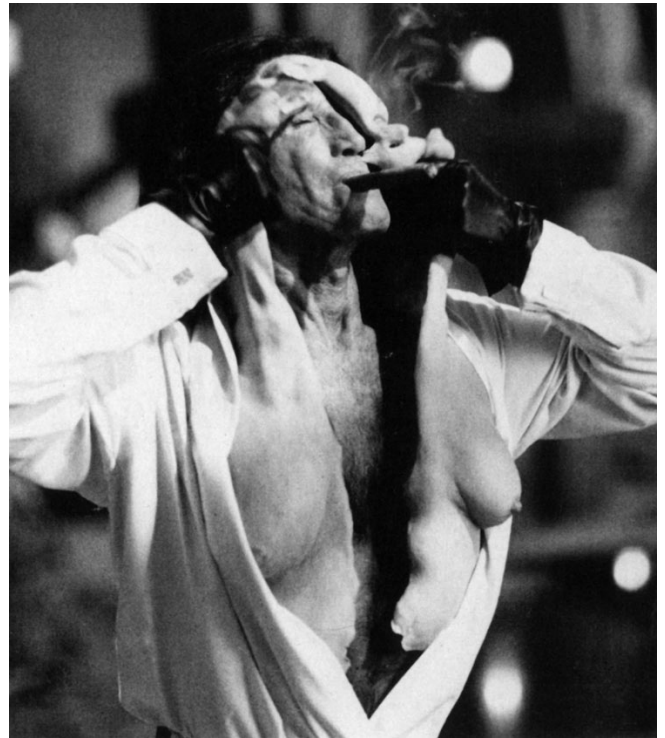
Once the look of the puppets had been defined, CWI did lifecasts of the actors — although, because absolute accuracy was not required, Jim Isaac stood in for the body of Joseph Scorsiani. To create the dissolving look of the Kiki puppet, Isaac and crew turned to a technique that Stephan Dupuis and Kelly Lepkowski had employed to disintegrate the Donovan character in *Indiana Jones and the Last Crusade*. “We decided to use something similar in an isolated area of the puppet,” said Lepkowski. “By laying texture underneath the skin, we could put a vacuum on it and make it look like flesh was being eaten away. We put two patches on him — one on the side of his face and another up on his head — that got sucked into big crevices. The patch on the top of his head also traveled inward — we could pull on a cable and make it look as though his face was starting to collapse and disfigure. It was a quick shot so we only had to time out two or three seconds of action for that.”



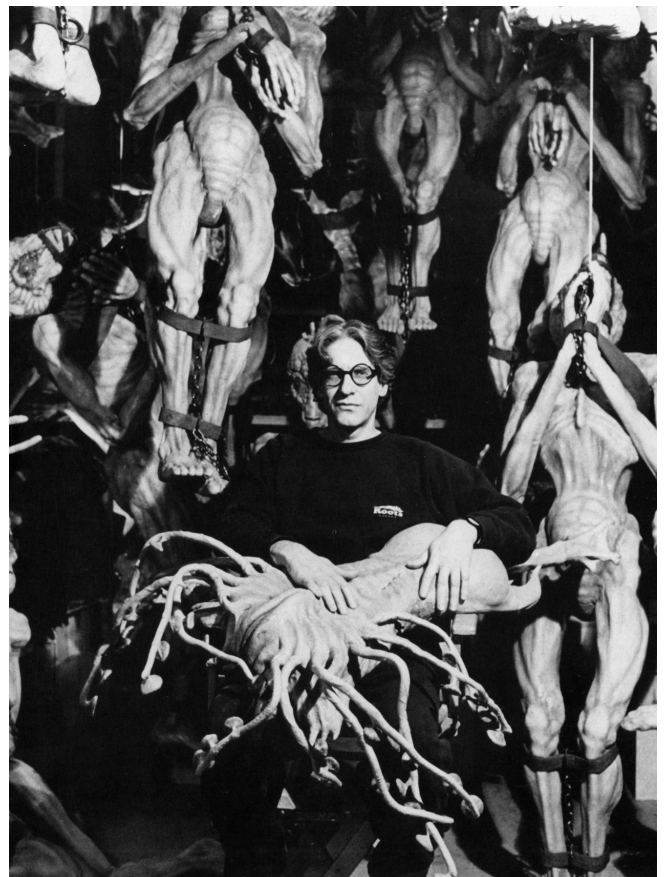
The only major makeup effect in the film was the transformation of the Interzone witch Fadela into the sinister Dr. Benway. For the first part of the gag, actress Monique Mercure wore a fabricated duplicate of her own chest over a foam rubber replica of Roy Scheider's. Split in two, the outer skin was lightly adjoined with K-Y jelly so that the actress could easily pull the halves apart and reveal the male chest beneath.

Both puppets were capable of only minimal articulation. “David assured us that he didn’t intend to linger on that scene for long. He just wanted something to give the audience an impression quickly. So we concentrated on the look of the characters more than trying to make them mechanical marvels.” The completed puppets were attached and operated from below with poles. “The whole rig was over six feet tall,” said Isaac, “so it was a cumbersome thing to operate. There was just two-way movement on each body and both of the heads were mechanical, with eyes and necks and jaws that moved.”

Suspecting that Fadela is the link to Interzone, Inc., Lee goes in search of Joan, who is still a part of the witch’s coven. He finds both her and Fadela at the mugwump dispensary. During his confrontation with Fadela, the witch rips open her chest, revealing her true identity to be that of the sinister Dr. Benway. The Fadela-into-Benway transformation was CWI’s only major makeup effect in the film, and was achieved in two stages. The first stage required actress Monique Mercure to tear away a fake chest piece to reveal the masculine chest of Dr. Benway beneath. Lifecasts of both Scheider and Mercure were taken so that realistic skins and appliances could be fabricated. “Monique wore a fiberglass piece strapped to her body with Benway’s foam rubber chest glued onto it,” explained Isaac. “The chest was fitted with bladders so that we could make it breathe. Then, over that, we attached a prosthetic piece of *her* chest — the one she rips open. It was split down the middle and connected lightly with K-Y jelly so that when she grabbed both sides of the skin it would open easily. With all of these pieces on her — the man’s chest and the female chest prosthetic — she was obviously several inches thicker in her torso than she would normally be. But because she was shot from just one angle in the front, it wasn’t apparent.” Gregg Olsson painted both the Fadela skin and the Benway chest underneath.



SA ‘Fadela skin’ affixed similarly over Scheider completed the transformation. Because the actor’s head was considerably larger than Mercure’s, silicone molds used in the fabrication of the skin were enlarged by soaking them in kerosene.



After Fadela reveals the man's chest beneath her own, the gag switches to Scheider wearing a 'Fadela skin' over his own head and face, with the ripped-apart torso section hanging loosely open. The major problem with the effect was that, in reality, Mercure had a much smaller head than Scheider. "Early on," said Isaac, "when I knew we were going to have to do this gag, I kept hoping that they would cast a small Benway and a large Fadela — but it didn't work out that way. So we had to cheat a little bit and expand the positive of Fadela as much as we could."

Surrounded by the tangible realizations of his fervid imagination, David Cronenberg relaxes in a dressing room reserved for the more unusual members of the Naked Lunch cast.

The job fell to Wim Van Thillo. "I expanded the mold of Fadela until we could get Roy Scheider's head to fit inside it. I experimented with it in my garage, submerging the silicone mold in kerosene. Silicone will expand twenty-five or thirty percent uniformly — after that it starts to distort. I'd immerse the mold in kerosene for about forty-five minutes, then take it out and I'd have an enlarged mold. The only problem was that it compromised the strength of the silicone. We could still use the mold, but it really progressed the aging process. I went ahead and used it and made a rigid foam casting. I did a clay press inside of that and gave it to Stephan and he just sculpted it right in. Then we took a mold of that and ran a skin."

Because the team had been instructed to make the effect look like a costume more than actual skin, Dupuis sculpted a very nonhuman-looking geometric design into the inside of the Fadela skin. "Rather than painting it to look like flesh," said Gregg Olsson, "I went into shades of pale gray — the same color we'd used for the mugwump. So there was some consistency in these things." In keeping with the costume idea, the Fadela skin was not dressed with any kind of slime on the inside. "Benway had to come out of the skin absolutely clean," Isaac explained. "We couldn't mess up his hair or his makeup when we put this skin on or when he took it off. So there was no goop at all."

The skin halves were placed over Scheider's face, connected with K-Y jelly and then painted to blend the seam. Complicating the gag somewhat was the fact that Benway was to be smoking a cigar. "We had to blend this prosthetic around the cigar," said Olsson, "or leave room for it so that when Scheider got on set he could insert it." Because the eyes on the Fadela prosthetic were closed, Scheider, once inside the piece, was literally blind and had to play the scene and hit his marks without benefit of sight. He did so without a hitch. "Both actors were excellent," said Isaac. "They played both sides of the gag so well that they really sold it. No matter how well we do our job, it always takes the actor to make that kind of effect believable."

Bringing David Cronenberg's bizarre images to the screen occupied the talents of CWI for well over a year. Handicapped by too little money, too few crew members and too little time, the unit still managed to produce some of the most original and unusual creatures ever put on film. "Naked Lunch was the first script we'd read in a long time that had everyone excited," Jim Isaac concluded. "And that is the deciding factor for us as a company whenever we choose to do a show or not. We don't really make decisions based on how big an effects movie it is or how good we are going to look. We try to pick projects that we can be enthusiastic about, with scripts and directors that we like. That has been very important to Chris from the beginning. We were really glad that we took this

particular project because it was exciting to be involved with something that was not just an effects movie.”

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LETTING SLIP THE DOGS OF WAR

article by
Kevin H. Martin



At this point in history, the phenomenon known as *Star Trek* encompasses virtually all forms of media, from film to video and software to audio. Having established a massive and loyal following spanning much of the world, series creator Gene Roddenberry's 'Sixties'-eye view of utopia has been continued by Paramount Television's uniquely successful *Star Trek: The Next Generation*, the most popular of all currently syndicated shows on the airwaves. But it is the theatrical films, featuring the original cast of characters, which have grossed hundreds of millions of dollars at the boxoffice. With *Star Trek VI: The Undiscovered Country* — purported to be the last film featuring the original cast — the filmmakers faced the challenge of topping the five previous entries, bringing about a logical closure for the series and paving the way for future versions featuring new characters.

But after saving the earth twice from marauding probes, defeating the menacing Khan once more, and searching first for Mr. Spock and then for God himself, what was left for the *Enterprise* crew to accomplish? Director Nicholas Meyer, who had restored energy to the series with *Star Trek II* and contributed an eleventh-hour rewrite to *Star Trek IV*, was brought in at the behest of executive producer Leonard Nimoy. "Initially the process started when Leonard came up with a one-sentence idea that I liked," Meyer recalled. "We knew going in that this was going to be the last installment, but that one sentence did not concern itself with wrapping up the whole saga." Nimoy's idea — which, like many episodes in the original series, mirrored recent world events — focused on a dramatic turn of events within the Klingon empire that might at long last bring peace between them and the United Federation of Planets.

To create the requisite visual effects for the sixth *Star Trek* installment, Paramount turned to Industrial Light and Magic, which had handled these duties on three previous *Enterprise* voyages. Under the direction of effects supervisor Scott Farrar, ILM would provide both conventional and computer generated animation, as well as numerous model shots. "The production sent us a script," said Farrar, "and we did a set of storyboards based on that before having our first get-togethers. Present at those meetings were Nicholas Meyer and producers Ralph Winter and Steven-Charles Jaffe. We had not done *Star Trek V* for them, and since they felt there had been problems with the effects on that picture, it was Ralph's opinion that we should absolutely do this one. It was a

positive, productive meeting; but at that point, *Star Trek VI* still wasn't fully green-lighted. Nevertheless, we started talking about all the various shots and sequences, so we got a good idea of what Nick wanted to see. When the director is also the writer, he can give you a lot of ideas that are different from what you get in just reading the script."

"Prior to that meeting, we did a breakout of the effects shots," effects producer Peter Takeuchi explained. "From that list, we had a rough calculation of what those shots would cost. Paramount had a specific dollar figure in mind for the effects; but our initial estimate was over that amount, so we entered into a consulting agreement with them, the objective being to re-design the shots so as to come in at their figure. At that same point, certain shots were removed from our domain and parceled out to other facilities." Other companies sharing in the effects included Pacific Data Images, which performed wire removals on several zero-gravity shots; Visual Concept Engineering, a contributor to *Star Trek II* and *V*, which provided transporter and phaser beam animation; and Cinema Research which took on a number of optical composites. To increase the visual scope, Matte World was selected to do three matte shots.

With the disappointing returns from *Star Trek V* well in mind, Paramount resolved to hold the budget of *Star Trek VI* at approximately the same level as its predecessor — this despite the fact that the script called for expansive space battles and innumerable alien lifeforms. Negotiations with the three leads resulted in pay cuts, which reduced the overall expenditures while still guaranteeing the actors significant profit participation should the film succeed. "The studio spent a month and a half fighting with us over the budget," Meyer stated. "To some degree, almost every area of the production was affected by the cuts — but the script was the one thing that did not become a casualty. I told everyone that there may not be any actors in the movie and there may not be any special effects in the movie, but the script was still, for the most part, intact."

Ultimately, certain scenes were dropped, primarily in the introduction of the principal characters. "One idea we worked on was when Scotty first appears," effects art director William George remarked. "Originally, they had him giving a lecture in a hall, but we moved it into a hangar that held the remains of the *Bird of Prey* from *Star Trek IV* — the idea being that the Klingon ship would have been brought up from the bottom of San Francisco Bay. We had this beautiful design for a matte painting, with Scotty lecturing in the foreground while, behind him, the *Bird of Prey* gets disassembled and studied. Another scene had Captain Kirk getting picked up in a taxicab. We were going to do this shot looking down Grant Street in San Francisco with Kirk's taxi zipping past cable cars — only they're all flying!" Another deleted sequence was to occur much later on, when Spock decides to take the *Enterprise* to the Rura Penthe prison planet to rescue Kirk and McCoy. "Spock has to get there covertly, so he slips the *Enterprise* into this freeway of asteroids, allowing the ship to kind of coast past the border. It was a three-shot sequence that would have been great, but this also came out fairly early on."

"One of our initial goals," Farrar revealed, "was to boil down the number of shots in the picture. If there were three shots that were similar, we'd try to tell the story with just one. It was a way of economizing, as well as keeping things simple and telling the story as directly as possible. We also shot what we called 'wank-o-matics' — kind of videomatics, but a little wanky — with the idea of making it easy for Nick and his editor, Ron Roose, to cut something into the picture early on. This would also insure that there would be no costly surprises later. The boards did change as things

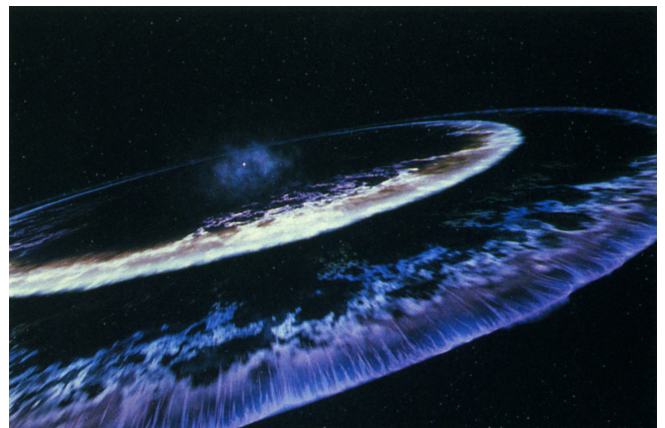
progressed, but essentially everyone was talking the same story. If there was a change in the shot, we redid the videomatic, and that became the new blueprint.”

One cost-cutting measure suggested early on involved the use of stock footage from previous films. “We actually encouraged the production office to use stock whenever possible, but it was a problem for them to go through the film library to find things that would work for this particular story. You’d think that it would be easy to find a shot of the *Enterprise* cruising left to right, growing from small to large in the frame, but usually there was something about each shot that just didn’t work.” The supply of usable stock footage was limited even more by a plot turn back in *Star Trek III* when the original *Enterprise* was destroyed. All shots of the new *Enterprise* featuring the ship’s hull graphics had to reflect the update in its registry — the ‘-A’ added to the famous ‘NCC-1701.’ “Finally we were able to pull and recomposite a shot of the *Enterprise* in dock from the end of *Star Trek IV* — but we had to do a lot of color correction on it to get it to fit this show’s color scheme.”

Associate producer Brooke Breton was charged with overseeing the various effects facilities as well as creating the viewscreen footage seen throughout the film. “Many of the viewscreen and monitor pieces make very specific story points — the number of photon torpedoes left in an inventory, analysis of Klingon blood type, a visual display aid used to search for missing crew members down on a planet — and since they are prominently featured and the actors have to be able to relate to them, they call for extremely specific designs and comprehensive planning. I broke the script down into ‘wallpaper’ graphics — general background pieces seen on the *Enterprise*, *Bird of Prey* and *Excelsior* — and story point graphics. Then we discussed what kinds of graphics and hues would be appropriate for particular scenes and ships. For the Starfleet vessels, we favored blues, greens, whites and magentas; whereas on the Klingon ships, a lot of hot reds and oranges and yellows were used.” Breton herself



In the opening moments of Star Trek VI: The Undiscovered Country, a Klingon mining colony on the moon Praxis explodes, sending a Shockwave of energy and particulate matter through the remote star system. The computer graphics department at Industrial Light and Magic was responsible for the blast. Building upon a lens flare simulation, the department created a luminous plasma burst comprised of two expanding disk shapes with swirling detail texture-mapped onto the surfaces.



In the opening moments of Star Trek VI: The Undiscovered Country, a Klingon mining colony on the moon Praxis explodes, sending a Shockwave of energy and particulate matter through the remote star system. The computer graphics department at Industrial Light and Magic was responsible for the blast. Building upon a lens flare simulation, the department created a luminous plasma

handled the shots involving live-action scenes, taking the footage to Composite Image Systems, where she added video distortions, logos and other graphic effects before transferring the footage back to twenty-four-frame video and 35mm film for on-set playback. “We had a master station for twenty-four-frame video; so whenever the director wanted one or more of the small screens to duplicate what was being rear-projected onto the main viewer, we could quickly accommodate him.”

“Whenever there were shots involving actors on stage,” said Farrar, “we shot them against black instead of using bluescreen. That saved having to relight the sets every time there was a bluescreen situation. Since a key concern on this show was to keep everything moving, I suggested that whenever there needed to be an actor in the shot that we make sure the actor was not in front of an area on the viewscreen where a ship was going to be put in later. If he was in the area where stars needed to be put in, that wouldn’t present too much of a problem, since we could do a simple roto around his head. That approach worked fine.”

“Prior to the project being green-lighted,” recalled Takeuchi, “Paramount made a decision to use only the existing models. Those were then crated up and shipped back up here for refurbishment.” The restoration of the models — some of which were more than a decade old — proceeded a bit differently than it had in the past. “Some of the ships hadn’t been examined internally for several years,” said Farrar, “so electrical problems had developed in the meantime. During production, there’s never enough time to go in and fix these things properly, so it’s a matter of jerry-rigging the models so they’ll last until the next shot. This time we went in and really fixed things up.”

“It’s surprising just how well the *Enterprise* has held up over the years,” noted George. “After all, it’s twelve years old. There were hairline cracks that had to be puttied and then sanded down; but structurally it was still pretty sound.” Nonetheless, one of the most distinctive features on the model — its pearlescent paint job — was marred during the restoration. “On the first film, Doug Trumbull used a frontlight-backlight matting system that allowed him to photograph this shiny model without much of a problem. But a lot of the pearlescent effect — which in person was quite striking — never showed up on screen because the human eye is more sensitive than any film stock. On the second film, we built the Reliant — another starship with a slightly different configuration — and we created a similar look, but without the elaborate finish. Instead, we used varying shades of gray paint. When one ship is next to the other on screen, you can’t really see the difference; so when Kim Smith repainted the *Enterprise*, she used conventional techniques which on film still match what has been seen previously.” Most substantive modifications would ultimately save considerable production time. “The original power bus was situated in such a way that about two dozen small wires had to be snaked individually through the different access ports. Jon Foreman went in and rewired the *Enterprise* with two specific goals in mind: one, make it easier to mount by having a single harness to route through and connect up; and two, since we wanted to cut down the number of passes required for each shot, the exposures for the various lights on the ship had to be much closer in intensity.” Prior to this, the running lights, window lights and sensor dome had been

burst comprised of two expanding disk shapes with swirling detail texture mapped onto the surfaces. On patrol in the area is the Excelsior — under the command of former *Enterprise* helmsman Sulu — which is engulfed and nearly destroyed by the punishing Shockwave. Motion control photography of the ship was scanned into the computer system and made to interact with the digital imagery.

shot with separate passes; but by reworking the wiring, these could now be recorded in a single pass, thus reducing stage time.

While the models were being restored for filming, makeup supervisor Michael J. Mills was preparing the vast assortment of alien creatures called for in the script. Enormous numbers of Klingons were required, and more than just a smattering of other familiar and unfamiliar races. Working with Mills was a talented team of artists including makeup department head Ken Myers, with whom he had worked previously on *Star Trek V*. Other principals included Richard Snell — responsible for the design and fabrication of Klingon, Romulan and Vulcan makeups — and Edward French, who created and applied makeups for the remaining aliens. “Richard and Ed supplied both materials and crews on this show — and there was a tremendous demand for both,” Mills recalled. “This was the largest makeup endeavor for a *Star Trek* film ever. We had to design custom makeups for twenty-two principal actors, and there were as many as one hundred twenty six prosthetic makeups to churn out each day. Fortunately, I had an army at my disposal. There were always fifteen or twenty makeup artists on hand, and sometimes that number went up to thirty-eight, along with twenty-five hairstylists. And that doesn’t take into account the enormous number of support people — moldmakers, ventilators, foam technicians, sculptors, wig-makers — everyone somehow managing to keep up with all this on a daily basis for the duration of the shooting.”

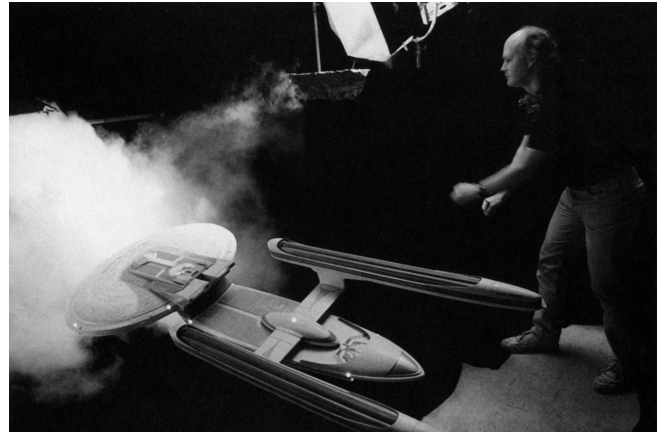
The makeup budget for the film had to be revised even before shooting began. “Early on in preproduction, the budget was already gone. But everyone realized what an important part of the production makeup was going to be, so there was a real effort made to give us what we needed to be able to do all of this complex work. It certainly wasn’t a ‘blank check’ situation, but if we could prove to Ralph that we needed something to get the shot done, then we’d have it.” Ultimately, Richard Snell’s makeup lab would employ a staff of twenty-five and produce over three hundred prosthetics, ranging from Klingon appliances to Romulan and Vulcan ears, with Ron Pipes coordinating the production and shop foreman Andrew Kenworthy taking charge of the lab when Snell was on the set. “Ed French came up with a number of different designs for the alien extras, including several updatings of races depicted on the original TV series. We got Paramount’s okay, and then built on those Fred Phillips designs, enhancing them a little while still keeping them recognizable for the fans. Doing that made the work a lot more fun and sort of kept things interesting. In addition to designing all of those aliens, Ed also did the actual makeups on most of them himself — he was a regular one-man band.”

Early on, French was tasked with an assignment that took priority over preparing for the main unit shoot. Steven-Charles Jaffe — doubling as second unit director — was taking a crew to Alaska for a scene in which Kirk and McCoy escape from a subterranean prison compound located on a barren ice planet. Accompanying them is a shape-shifting alien in its default form as a simianlike creature referred to simply as the Brute. “Nilo Rodis had done an excellent pastel drawing,” French recalled, “and a gorgeous *Smithsonian* cover with a golden marmoset on it was also an inspiration. The Final design was quite exciting. There was something vaguely Yeti-like about it. Despite the weight and bulk of the costume, Tom Morga — the stuntman inside — carried himself with a regal air, and there was a beautiful lionlike look to the character with its long red mane blowing in the wind.” Costume designer Dodie Shepard designed huge cleated boots for Morga, over which French fashioned a fiberglass appliance with clawlike extensions. Also constructed by French for the Alaska shoot was a

dead, frozen Klingon which Kirk and McCoy discover as they make their way across a vast glacier. “I went to Richard Snell’s lab and got a Klingon appliance he had left over from a previous picture. I came back and slapped the thing on my own head. Jeff Kennemore did a lifecast of me with this horrible expression, and that’s what we used as a basis for the Klingon dummy.”

Not everything went precisely as planned during the remote location shoot. “Originally we had wanted to take the main unit to Alaska,” Jaffe recalled, “but for monetary and logistical reasons, it was decided to do it with a small second unit crew instead. I was on a glacier — by helicopter, about forty minutes east of Anchorage — with very little time and money. We had two-and-a-third days, and that was it. I had gone up a month ahead of time and spent two days deciding what to shoot. There were certain ice formations that looked positively unearthly that could never be replicated on a soundstage regardless of the budget. I decided to take advantage of that by doing a shot of the main characters emerging from this ice cavern. But when we came back to do the shoot, the glacier had moved — no ice cavern. So there we were, in ten-degree weather, wondering what we were going to shoot. Eventually we came up with some stuff that worked and cut in well with the quick shots of the principal actors that were done later at the studio.”

With the second unit detour to the north complete, preproduction resumed for the makeup team. “Since the Klingons were to play such a major part in the proceedings,” Mills explained, “the director wanted them to be as believable as possible. He wanted the audience to watch the actors’ faces and not be distracted by the makeups. So every one had to be a custom job — which translated out to about three-and-a-half hours. Richard Snell did a great job of coming up with all sorts of different designs for the Klingons, and we used the newest techniques and glues and paints for the applications — which was important since these characters were being seen face to face with the principal actors playing humans. The appliances had to be very thin in order to allow the expressions on our actors to come through and read clearly. Ron Pipes, working with Richard Snell, did a lot of work designing the wigs, which played a substantial role in making the characters look more believable. Our hairstylist,



Visual effects supervisor Scott Farrar directs the deployment of smoke into a blackened stage for another shot of the Excelsior being buffeted within the cloud of radiating space debris.



Federation officials meet at Starfleet Headquarters to discuss an appropriate response to the unprecedented peace initiatives set forth by their counterparts within the Klingon high command. Modelmaker Kim Smith paints a hillside complex built by Jon Goodson for a wide shot of the sprawling headquarters — established in previous films as overlooking the Golden Gate Bridge in San Francisco.

Jan Alexander, was instrumental in coming up with various braids and jewelry which suggested a tribal people with a whole heritage and history behind them.”

Evolution was curiously at work on the *Enterprise*’s science officer, as well. “Leonard was adamant that since this was his last time out playing Spock, he wanted to look as much like the original Fred Phillips and Charlie Schram design for the character as possible,” said Mills. In recreating the desired coloration and ear design, Mills consulted photos from the original series, and was ultimately required to search for antique makeup — which he subsequently had remilled to supply the production’s demands. “Leonard went through four or five different sculptings,” Snell recalled. “I would rough-sculpt ears and show him how they would fit on his head. The ear tip has actually changed considerably down through the years — the ones I produced for *Star Trek IV* were shorter and swept back, whereas these were very tall and pointed forward.”

For *Ambassador Sarek* — Spock’s father and a recurring character in both TV series as well as the films — a particular look had already been established. “I didn’t really know this at the time,” Mills related, “but actor Mark Lenard had appeared as Sarek on *The Next Generation* at age 220. Fortunately for us, Jerry Quist, who is second makeup and lab designer for the show, is a very good friend of mine; and since they were on hiatus, he agreed to come on. So I just let Jerry take care of that, and he came up with an intermediate look for Sarek — something between what we’d seen in the previous features and what people would be seeing him as on TV. Those were the only two Vulcans we had to do design work for, since Kim Cattrall, who was playing Lieutenant Valeris, had her own ideas about what she wanted to look like.” Valeris — in earlier drafts named Saavik, as the initial intention was to lure Kirstie Alley back to the part that launched her career in *Star Trek II* — was a young Vulcan woman with an attitude. Cattrall brought in a sketch which pretty much nailed down the character’s appearance, including the severity of the haircut, which was considered by Meyer and Nimoy to be in keeping with what had been established for Vulcans. “Complexion-wise, it was a bit different from what we’d done with Leonard — more ivory than yellow. The upswept eyebrows were a little sleeker as well. We went to great pains to establish that this is the way a Vulcan woman — a sexy Vulcan woman — should look.

“Once production began, my army of guys would do extras by the thousands. A lot of the time we started at one o’clock in the morning for an eight o’clock call — which meant that we had to do makeups that would stay on and not require a lot of maintenance right through to six or seven in the evening. They had to have the desired look, while also remaining pretty much bulletproof.” In addition to personally handling the makeups for Valeris and Spock, Mills also did the Klingon Brigadier Kerla and Romulan Ambassador Nanclus. The facial features of the Romulans on *The Next Generation* have evolved into something pronouncedly different from the original series; but for this film, the Romulans — like Spock — were returned to their original form. “Basically, this time they had larger, bushier eyebrows and bigger ears. We stayed away from the forehead pieces and the radically different ears the new TV series has featured and just went with the original look.”

Though conceptual recycling was unavoidable, Meyer was not altogether comfortable with some of the hand-me-down aspects of the *Star Trek* series. “I’ve never been very happy with the look of the *Enterprise* sets or the way that they’ve been lit — and that unhappiness extends even to my own work on *Star Trek II*. On this most recent film, I kept trying to work around the ‘leftover set’ factor and deliver something that was more visually interesting — and more theatrical — than its

predecessors.” Toward that end, Meyer enlisted Hiro Narita as director of photography. Working within preexisting *Enterprise* interiors — the circular bridge set built by Herman Zimmerman for *Star Trek V* and numerous others inherited from *Star Trek: The Next Generation* — Narita strove to create a believable shipboard environment. “Hiro did a good job of keeping things dark,” commented Scott Farrar. “When you get into a stage situation with aluminum walls and shiny metal, it can be a problem. But by keeping the light down, you see a little bit less and it becomes a little more textural. Hiro was very keen to avoid that overly-bright stage look.”



For the Starfleet Headquarters establishing shot effects art director Bill George conceived a low-angle view that enabled the model hillside and buildings to be combined with live-action plate photography of the actual Golden Gate Bridge.

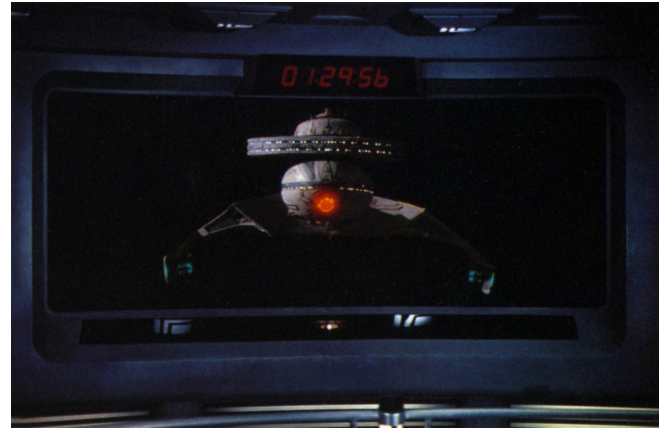


A small shuttlecraft — constructed new for Star Trek VI — ferries Captain Kirk and his senior officers to the orbiting spacedock where the Enterprise is being readied for her final mission.

The film begins with a bang — literally — as the Klingon moon Praxis explodes, sending a fiery Shockwave through the void of space that engulfs and nearly destroys the starship *Excelsior* under the command of Kirk's former helmsman Sulu. The flaring explosion and subsequent Shockwave were the first of three sequences featuring the work of ILM's computer graphics department. "The opening blast was a lens flare created in the computer by John Knoll," computer graphics supervisor Jay Riddle explained. "We shot a real lens flare, then used a program to build an identical lens in the computer. We could specify types of rings or a certain colored inner element reflection and then stack these different effects up. Every lens has its own special flare; so if you shoot one and study it, you can put it into the system. All you have to do is tell the system where in the frame the light source is and it will come up with the appropriate lens flare." For the surrounding starfield, the animation department produced an image that was scanned into the computer.

"We also had to create and animate the wave itself," Riddle continued. "Scott Farrar settled on a preliminary look for it, and Joe Letteri, who was responsible for the opening Shockwave, worked out the size of the thing and the speed at which it was traveling. Then Scott, Mark Moore and I sat down with a Macintosh and, using Photoshop, started going through various colors to try and determine a look for the various parts of the wave. Certain contrast levels had to be determined as there were different densities within the Shockwave. That Shockwave was a very luminous form, but it also had to possess the ominous quality of a huge, devastating force. This process would have taken days and days using our main computer; but with Photoshop, finding and settling on colors took only one afternoon." Riddle delivered the established color scheme to Letteri, who then essentially matched those colors on the main computer system. "We went with two flat disk shapes with texture mapped on which changed from frame to frame. It was like observing an ocean wave from a couple of miles up. That gave us our scale, so we stuck with that for the remainder of the shots."

For shots of the Shockwave hitting the *Excelsior*, new processes had to be developed. "Initially we thought that we could apply what we had done for the first Shockwave for the rest, but that shot wound up standing alone. A lot of it had to do with the scale — this thing had to look really enormous. There was a blue fiery wall, which we created with two curved pieces of geometry shaped like a slice out of a donut. We expanded that as it came toward us while simultaneously mapping onto it a computer created texture — which again would change from frame to frame. That texture included little sparklike flames coming off the main body of the wave; and we had flat disks with a different, streaming texture on them, both above and below the main wave, which gave the impression of great speed. Then the next wall — the luminous one — comes at the ship. We spent an awfully long time trying to get a brilliant, internally-lit look. We began by generating the



Charged with escorting Klingon Chancellor Gorkon to earth for peace negotiations, Kirk and his crew rendezvous with the Kronos 1 flagship in deep space. The chancellor's vessel — an existing Klingon battlecruiser model repainted for the current film — as observed on the main viewscreen of the Enterprise bridge.

wave in black-and-white; but instead of luminosity, what we got was something that resembled steam coming off dry ice. So when we injected color, we used specific hues for specific effects. We needed to put some orange in to give it a fiery quality, and white to give the idea that this thing is so brilliant it is overexposing the film, and blues to help suggest debris that was churning around inside — perhaps some kind of plasma.”

After some debate with Paramount about the size of the ship in the frame, Riddle shot the actual impact of the wave hitting the *Excelsior*. “We took the ship elements — they were scanned in separately — and put them in the path of the approaching wave. For the point when it actually strikes, we took the image of the ship and pushed it in the direction the wall would have — lifting it up and rotating it. We painted an articulate matte to allow the wall of energy to swallow up the ship, while at the same time we took some of the light and color of the wave and put it in over the ship to tie it to that new environment.” As the ship traveled further into the Shockwave, new textures had to be generated — shots of the *Excelsior* are much tighter as it struggles to survive the passage. “We created a number of planes with the wave interior mapped onto them, then slotted those in both behind and in front of the ship. Alex Seiden handled the creation of the interior textures and the shot that follows in which the *Excelsior* breaks free and flies out into normal space.”

Sulu discovers that the Klingon moon has been almost totally obliterated by a Chernobyl-style accident of cataclysmic proportions, but is warned via subspace communications not to approach. The action then switches to earth, where an emergency meeting of senior Starfleet officials — and the *Enterprise* crew — has been called to discuss the effect of the Klingon mining disaster. The establishing shot of the headquarters in San Francisco combined miniature elements with a live-action plate featuring the Golden Gate Bridge. “This shot was added so very late in the schedule that we didn’t even have the time to do a matte painting,” Brooke Breton said. “Bill George did a very nice design and then we had to quickly send a crew to get the bridge footage. Unfortunately there was a stretch of bad weather and the fog was so thick it obscured the horizon.” Finally the weather did clear, and the footage — shot from the San Francisco side of the bridge, looking across the bay at the Marin headlands — was obtained.

“In previous films,” George explained, “the location of Starfleet headquarters had already been established, so we were locked into that. Likewise, the top of the bridge had been shown to be covered with two strange tunnels. I wanted to take advantage of using the real bridge and real water beneath it; and since we didn’t have the time to build a miniature anyway, I designed the shot so that we’d be looking up at the bridge, avoiding the whole matter of what modifications had been made to the topside. We timed the plate so that it would go dark; and then, since the matte department here was busy on *Hook*, we gave it to John Goodson in the model shop. He built the hillside on the left of the frame and the headquarters itself — which was basically just a series of backlit plexiglass boxes.” An additional fog element was recorded, as well as some distant aircraft lights moving above the hill. The shot was complicated by an eleventh-hour decision to change the setting from night to dawn, but it was soon completed and cut into the picture.

Kirk receives his unwelcome orders — to escort Klingon Chancellor Gorkon to earth for peace negotiations. “When Kirk and the others head up to the spacedock to reboard their ship,” George explained, “we really wanted to open the film up and show the grandeur of space. Immediately I

thought of 2001 — in particular, the docking sequence between the Orion space clipper and the double-wheeled Space Station One. I also got the bug in my mind to do an angle on the spacedock that hadn't been done before. I looked at the model from all angles, and eventually ended up lying down on the ground to look up at it before I realized that was the perfect shot — it hadn't been seen before, plus it was the natural angle of approach if you were coming up from earth. We designed and constructed a new shuttlecraft model just for this shot, the only new model we got to do this time. It was done very quickly — in a week — and was about sixteen inches long."

Getting the *Enterprise* out of the spacedock was more of a problem for the filmmakers than for the starship's crew. The interior dock miniature — constructed for *Star Trek III* and subsequently reused in *IV* — was gone, and yet an interior view was needed. "Since we only needed an *Enterprise* POV of the spacedock doors as the ship goes zooming out," explained effects cameraman Peter Daulton, "that's the only section we built — the doors themselves and the surrounding wall area with the moving approach lights." The division of labor between cameramen Daulton and Pat Sweeney was settled early on. "There was about an equal amount of work if one crew did the *Enterprise* shots and the other took the *Bird of Prey*, Klingon cruiser and *Excelsior*. We rather jokingly decided to flip a coin. I don't remember if I won or lost the coin toss, but I got the *Enterprise* and Pat took the rest of the ships."

In shooting the spacecraft models, a combination of new and old techniques was employed. One previously perfected approach was to photograph the *Enterprise* and *Excelsior* fill passes in yellow light, which served to wash out spill from the bluescreen. "Even though we used tons of dulling spray on the *Enterprise*," George stated, "its shiny surface was still a problem. The yellow light gave us a nice clean edge." Though a yellow cast results, it is readily removed by filtration during the optical process. "The yellow fill passes were usually overexposed by about three stops," explained optical photography supervisor Bradley Kuehn, "which helped a great deal with spill. Even when you could see a bit of spill on the model itself on stage, it didn't come through as strongly on film when the ship was lit yellow. For the *Enterprise*, we would filter it down to be neutral gray in color, whereas the *Excelsior* went more toward blue-cyan."

One new innovation — a form of contrast control pioneered during the shooting of the shiny DeLorean in *Back to the Future II* — required an extra model pass. "Pat Sweeney and I have shot these ships a number of times over the years," Daulton revealed, "and so on this one we sat down and discussed ways of doing it a little differently. Traditionally, the *Enterprise* is always pretty bright, with plenty of fill light. What we did this time was shoot separate key light and fill light passes. When you have a shiny model like the *Enterprise* against bluescreen, you can't have an extremely contrasty lighting ratio. The key light can't be two stops over gray and then have the fill light fairly dark, because the fill area will pick up blue spill. So we shot a fill light pass with the



Since the spacedock interior featured in earlier films no longer existed, a pie-shaped minisection — with miniature approach lights — was constructed for a point-of-view shot as the *Enterprise* is piloted through one of the perimeter doors into space. Modelmaker Chuck Wiley

whole ship lit evenly against the bluescreen — with the ship exposed as a neutral gray. In optical, they would use that pass to generate the matte, taking that and printing it anywhere from two to four stops down, so they had flexible control of the fill light side of the model. Then we'd shoot a key light pass of the *Enterprise* against black. By combining these elements, optical was able to create any level of contrast they wanted. Scott Farrar was very intrigued with this look and encouraged us to continue with it. Essentially, by shooting this extra pass, we were able to eliminate the chance of blue spill while still giving ourselves a wide range of choices in establishing the lighting ratio." By keeping the contrast high, these shots give the impression that the *Enterprise* in space was actually being illuminated by a single, powerful source — such as the sun.

"Stage has only so long to shoot the elements," Kuehn remarked, "but when it comes in to optical, the shot has to stay until it comes out looking good. Since the budget was tight, we didn't have too many shots with multiple-ship elements to take your attention off the main ship. So there was a lot of pressure on optical to balance all the light passes and really sell the shot." One problem with getting the shots cranked out was the fact that Paramount continued to add new ones, even after the main unit had finished shooting. "The shot load really expanded, so in a few instances we used the same elements by just mirror-imaging them." Most of the time, this was done with the drifting starships and starfield elements; but on three occasions during the battle scenes, the *Bird of Prey* was flopped for quick shots of its firing.

The *Enterprise* — a thousand light-years from Starfleet headquarters — meets with the Klingon flagship *Kronos 1* in deep space. Early on, it was thought that a new spaceship model would be needed. "Paramount had already done some design work on this ship," said George. "Mark Moore and I did some additional sketches and I actually built a prototype. But it was ultimately decided that there wasn't money for this, so instead they decided to use the Klingon battlecruiser from *Star Trek: The Motion Picture*. Originally, it was dark green in color; but after uncrating the model, we found it had been covered with a white water-based paint. It looked like someone had tried to clean it off, but that hadn't worked. Since we were going to have to repaint it, we thought that even if it wasn't a new model this was still going to be a special ship, so we figured we'd make it look different — distinctive from what we'd seen in previous films. Mark and I sent out to the library for books on military hardware; and out of that research, we came up with the concept that when Klingons return victorious from battle, they add some new piece of equipment or new graphic to their ships. We chose medieval armor as both our color palette and our design springboard and devised this regal and ornate looking paint job, which everyone liked and approved, so we transferred that look onto the model." Additionally, the warp engines on the ship were updated with internal lighting visible through jagged slotted patterns in the hull.

Bristling with mutual suspicion, the Klingon emissaries meet their Federation counterparts on board the *Enterprise*. Accompanying the visionary Chancellor Gorkon are his daughter Azetbur and the charmingly lethal General Chang. Richard Snell designed the appliances for these characters

examines the completed model on stage just prior to the shot. McCoy (DeForest Kelley) and Kirk (William Shatner) are met with hostility when they beam aboard the Klingon vessel. Makeup supervisor Michael J. Mills had to address the largest and most varied alien makeup requirement in the series' history. Overseeing a contingent of sixty-some makeup artists and hairstylists — supported by a small army of fabricators and technicians behind the scenes — Mills produced custom makeups for twenty-two principal actors, plus background masks and appliances for many others.

and the accompanying Klingon security force. “The designs came from a lot of different places — from me and the people working under my supervision, from art director Nilo Rodis and from the director. However, some of the actors had specific ideas about their characters, so we opened up a dialogue with them as well. Christopher Plummer, who was playing General Chang, did not want to resemble any other Klingon. He was interested in the makeup effect being more subtle, with more human characteristics. So we made the bone ridge on his skull very subtle. Nick Meyer’s input on General Chang was to make him look like Moshe Dayan — right down to the eye patch, although the idea of the patch being attached by bolts through the skull came from one of Nilo Rodis’ sketches.”

Plummer also requested that one of the eye bolts be untightened slightly — suggesting a Klingon who quite literally had a screw loose. “Originally I sculpted the back of Chang’s head without a lot of detail because we intended to use a nice wig that had been done for him by Jan Alexander. But during the first test makeup, after I had applied and painted the prosthetic, I heard Christopher say: ‘This is it! This is what I want — no wig.’ We finally convinced him that he needed something back there, so he wound up wearing a warrior’s topknot — very samurai in design — but since the back half of the head had been sculpted with very little musculature, I had to come back to the shop and resculpt everything. New molds were made, and it all had to happen in the space of about a day and a half.”

Kenny Myers was tasked with doing the application for Azetbur, played by actress Rosana DeSoto. “The first time I did her, we took her to the barbaric side — very sallow, with hair hanging down on her shoulders — and when we brought her in, Nick said it was all wrong. He wanted her to look like Nilo Rodis’ production drawing. Everyone in makeup asked, ‘What production drawing?’ No one had seen it, but the drawing had been done many weeks previously and that concept was what had stuck in Nick’s mind. Overnight, Richard started producing a new sculpture and wig to follow Nilo’s design, which was of this very regal woman who just happened to be Klingon — there was nothing barbaric about her. We had only a few days left before shooting, but it all came together very quickly and we nailed that makeup down and got it approved.” DeSoto, like Plummer, wanted less prominent bone ridges. “We kept taking them further and further down,” Snell recalled, “while also having to adapt the sketch design, because that illustration really had no similarities to a human face at all. During these modifications, we added a piece to flatten out the nose, so there would be a nice straight line running from the tip of the nose all the way up the forehead.”

The application of the Azetbur makeup was extremely time consuming, requiring nearly an hour more than any of the other characters due to the fact that a beauty makeup was also involved. Because of the additional time required for this application, Myers was forced to relinquish his other assignment — David Warner as Chancellor Gorkon — to Margaret Bessera. Gorkon’s appearance was of special concern to the director, who had two specific role models in mind — Captain Ahab and Abraham Lincoln. “Nick loves to play the classics,” said Myers,



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series requested that the general be made more singular in
appearance by rendering his Klingon skull ridges less
pronounced and by giving him a shaved head.

to be the culprit, the source of the photon gel — a cloaked *Bird of Prey*. Like the other before it could go in front of the cameras. Once where the *Bird of Prey* flew around the sun black-tinted rubber cement to suggest the after the film. Well, it never did get removed; back for this film, the cement had baked itself different ship than the one seen in *IV*, we had to go

s 1, which has lost its artificial gravity field. To shoot their way to Chancellor Gorkon and the physical effects and stuntwork with the live-action elements fell to the second unit. The stunt coordinator read dynamically — very exciting stuff. Movies have required months to prepare and I did not have the advantage of Ralph Winter with wire work on *Star Trek V* — specifically the Klingons being fired on and the lantern

er of the weightlessness shots required digital
s simply disappeared into the set. Jaffe felt
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e had, we would probably have done it
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and floats suspended in globules within the
were Klingons getting shot,” said Farrar, “and
s the frame had to float in a convincing
animate Klingon blood and remain somewhat
sting — and not too gory.”

Computer graphics was used to create the imagery of blood floating in a weightless environment. “After an initial test phase by Scott Anderson and Liza Keith,” stated Jay Riddle, “Joe Pasquale and Alex Seiden did the first shot when the Federation assassins beam aboard and shoot the unfortunate Klingon at the transporter console. It was sort of our testing ground for the sequence since we used it to develop the color of the blood and found out how it would move and react to the colored lighting in the room. The technique we used for most of the shots is something we call ‘blobbies.’ It’s a way of describing fairly complex shapes by placing spheres in space, then running them through a program which smooths them all together, producing one continuous shape. If you move the spheres further apart, the shape created through blobbing actually stretches to a certain point, then breaks apart — which is very hard to do using any other method of modeling in computer graphics.” Jim Mitchell did the follow-on shot, with the still bleeding Klingon slamming up against the wall. The assassins move through the ship in search of their quarry while the Klingons continue to float around helplessly. Encountering Gorkon’s personal bodyguard, the killers sever his arm with a phaser shot. “We had to match a phaser element done by Pete Kuran at VCE, so we had clips of that work. Chris Green used Photoshop on a Mac to paint a phaser shot over our final composite — which was a pretty involved process as there was the beam, the blast as it hit the guy and a burn mark on the wall behind after the arm is torn off. Then the arm — which was shot bluescreen by Peter Daulton — comes tumbling by. We match-moved on the arm so that there would be blood coming out of it as well as out of the guard.”

Paramount provided a sample of the Klingon blood used on the set as a reference. “We had that,” Riddle continued, “plus the plate photography as a reference. But in the plates, which had been shot under red lighting, the stuff didn’t have the right color. Paramount was adamant that the blood not look red like human blood. They wanted it pinkish — like Pepto-Bismol. That kind of color is hard to get when all the lighting is deep red. We went back and forth and eventually compromised at a point where it doesn’t stand out as being too odd. Also, we photographed the actual sets to use as reflection maps so the shiny blood would be reflecting the walls and ceiling and floor as it drifted along. We matched the on-set lighting positions in the computer and had them flashing in the same timing as the live-action.”

One shot in which Riddle took particular pride featured the assassins moving through a doorway after shooting the guard. “The lights in the scene cast shadows from the blood onto the actors as they walk by. Joe Pasquale did a lot on this shot, and we used a process called ‘match-modeling’ — creating shapes on the computer which match the figures of the assassins, then animating those shapes to correspond with the actual actors’ movements. Next we took our CG blood, put the lights on it, and projected the shadows from the blood onto those shapes of the actors. We extracted just the shadows from that and composited them onto the original background plate of the actors, so everything matched up — it really sold the shot. Also, we had layers of blood in front and behind them; and we were able to use a capability of Renderman which helps the viewer to know exactly where the blood is in relation to everything else by limiting the depth of field. Basically, it emulates what the production camera would have recorded if the blood had actually been in the air during the live-action shoot. Since Renderman computes depth of field, you can set an f-stop as well as a specific focus, just as you would shooting conventionally. So the blobs of blood that come by the camera go out of focus while the blood on the same plane as the subject remains sharp.”

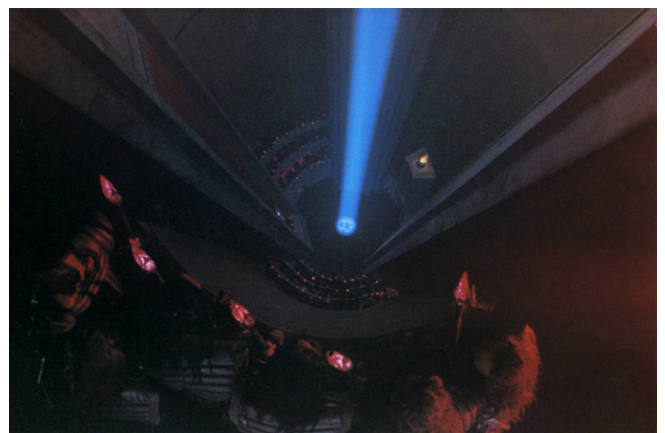
In that same sequence, ILM was also called upon to enhance — and in some instances create — elements that had not been achieved on stage during the live-action shoot. “A couple of the Klingons get hit by phaser fire, and their uniforms are ripped at the point where the beams struck. Some of that was handled with pyro effects on the set; but there were other occasions — when we were shooting plates that no one was sure would be used — when they didn’t want to destroy the garment. In those instances, our CG people would have to put the tear in the uniform. In one case, Rich Cohen used Photoshop to paint a tear that moved with Gorkon. Then Jim Mitchell did the shot after Gorkon is hit and is spinning around. The rip in his garment — which is computer generated — is spinning along with him as all this blood is spurting out.” Additionally, a certain amount of haze — the usual Klingon atmosphere — had to be layered over the blood to maintain the depth effect. Interactive effects included animating the beam of a tumbling flashlight as it played over the floating blood. Bluescreen elements composited into the scene included Gorkon’s walking stick, a calculator and a Klingon flask — which, fortunately for the computer graphics department, was empty.

The assassins step onto the transporter to return to the *Enterprise*, unaware that they are taking vitally incriminating evidence with them. “A current of air pulls a blob of blood into the transporter beam with the assassins. Rich Cohen animated that one, and we again cast shadows from the blood onto the floor. Rich also had to animate the blood moving along and bouncing off one guy’s boot.” Subsequently, when the power is restored aboard *Kronos I*, gravity returns to the vessel. “Wade Howie did the gravity restoration shot, which shows the blood first drifting down, then falling out of frame as the gravity comes up full. The lighting changes dramatically — colored emergency lights stop flashing as the ship is returned to standard illumination — so Paramount was insistent that the blood look very pink in this shot, in order to match exactly with all of their production footage shot under normal lighting. This meant we had to change the lights in the computer from red and flashing to slightly bluish and fluorescent looking.”

Kirk and McCoy beam aboard the Klingon ship to render aid, only to find themselves arrested and hauled off to stand trial for the murder of Chancellor Gorkon. The Klingon courtroom set resembled an arena, with prosecutor Chang and defense attorney Worf (Michael Dorn) circling a defendants’ box on the stage floor, while above and around them a



A conspiracy to derail the peace talks is enacted when photon torpedoes cripple the Klingon flagship and armed assailants board the now weightless craft to assassinate the chancellor. Globules of floating blood spurt from one of Gorkon’s guards in a scene combining on-set wire work with postproduction computer graphics.



Brought to trial for the atrocity, Kirk and McCoy find themselves in a courtroom filled with angry Klingons. A high-angle view — combining a live-action foreground

horde of hostile Klingons in viewing stands shout for retribution. “There were sixty-six Klingons in some of those shots,” Michael Mills noted, “six of which were key principal makeups. Fifteen more extras were made up with the same level of detail as these principals. Whenever we had a shot with a guard or an extra in the frame with one of the main actors, we used one of these A-level makeups, which also were seen on all the Klingons on the first tier of the stands. For those on the second and third tiers, we were able to use pullover masks, since with the amount of smoke on the set and the distance separating them from the camera, they couldn’t really be seen that clearly.” Fifty-six masks — individualized with hairstyling and ceremonial trinkets — were fabricated by Richard Snell for the scene.

Augmenting the partial set was a series of effects shots supplied by Matte World. Founded by former ILM matte camera supervisor Craig Barron, together with matte painting supervisor Michael Pangrazio and production manager Krystyna Demkowicz, the fledgling effects house has — in three short years — contributed matte shots for a double fistful of films, including *Arachnophobia*, *Avalon* and *Robin Hood: Prince of Thieves*, as well as Emmy-winning miniatures and matte paintings for the HBO nuclear thriller, *By Dawn’s Early Light*. Miniatures were also featured in the first of three shots produced by the company for *Star Trek VI*. “We based the shot on storyboards supplied to us by Nilo Rodis. The sequence actually begins with a close shot looking down at Kirk and Bones, then cuts back further and further until we are high in the air above them, looking down from a balcony.” Barron delved into the past for an approach to the shot and found inspiration in the silent *Ben-Hur* — specifically, the *Circus Maximus* chariot race sequence which utilized moving miniature puppets in the stands. “We freshened up the approach with motion control, and for the puppets we used two hundred of the commercially available seventy-second-scale Lieutenant Worf dolls which were sent to us by Ralph Winter. In order to suggest an angry crowd, these Klingon dolls were rocked back and forth with a series of cams driven by stepping motors we had plugged into our motion control system. Each of these Klingon figures held lighted spears that used twelve-volt grain-of-wheat light bulbs dyed red with stained glass pigment. The courtroom miniature — which was about ten feet in length overall — was built by modelmaker Howie Weed.”

To achieve the proper look of Klingon ‘atmosphere’ — and match the main unit cinematography — the miniature was photographed on its side in a smoke room with a series of separate passes to incorporate the various elements. “Hiro Narita shot the live-action with Kirk and Bones standing in a very bright vertical beam of light — sort of the Klingon equivalent of giving them the third degree. When shooting the Vistavision plate — which was later rear-projected into the base of the miniature courtroom — we did it without the light beam, since we knew it would be much easier for us to put our own beam in rather than have to match the

with a miniature midsection set and a tiny projection of the accused standing far below — was produced by Matte World.



An enlarged section of the Enterprise was built for a scene in which a photon torpedo is fired completely through the dish. Modelmaker Eben Stromquist and model shop supervisor Lawrence Tan dress the rupture area on stage.

intensity of the original stage photography.” But putting the beam back into the shot became a problem as the amount of heat generated by the five-thousand-watt lamp used during the long exposures — which required an interval of eight seconds per frame — caused the perforated metal plate that determined the width of the beam to move during the take, creating the unwanted effect of a spotlight moving across the frame. Machinist Dave Beber-Vanzo effected a solution by replacing the metal plate with a piece of molybdenum that remained stable even at very high temperatures. The uppermost tier, which contained the foreground live-action Klingons, was photographed at Matte World. “We cast extras locally as well as using our own staff — anyone who could fit into the costumes — and built the balcony on our stage. Also there was a fire element that went down on one of the concrete pillars. We borrowed a hibachi, put some logs in it, took the camera up on the roof and shot down at it in the proper perspective. Then with reduction rear projection, we added it into the miniature set.”

Kirk and McCoy are convicted and sentenced to life imprisonment on the Rura Penthe prison planet. Matte World provided an establishing shot of the icy surface as several distant figures trek through the hostile surroundings while the system’s three suns glow dully in the sky behind them. “Brooke Breton supervised all of the plate shooting we did up here in Marin,” Barron said, “and directed this shot, which was photographed on an overcast day on a beach below the Cliff House in San Francisco. We shot our extras walking on white plastic — which essentially produced a plate of these figures on a field of white. One of the extras was carrying a large Klingon flashlight — a prop used by the main unit — but even in overcast daylight, the lamp just wasn’t bright enough to register. So we went back into the shot later on and match-moved a little light bulb over the existing one to beef up its exposure. That actually helped the shot considerably since it gives the audience a focus while tying it into the next shot in the sequence. We rear-projected that plate into our snow matte painting. There was an additional exposure for the three suns visible in the sky behind them, as well as a Vistavision snow element double-exposed over everything. During the course of the shot, the camera trucks in, so we had to do a move on the snow element as well as the rear projection main plate.” Since a lightning storm is underway, additional passes were made on fiberfill clouds with lights mounted behind them to produce the electrical discharges.

Brought before the commandant of the underground prison, the *Enterprise* officers get a taste of what lies in store. “To illustrate the penalty for disobedience,” Michael Mills explained, “the commandant takes a prisoner in a loincloth and throws him outside to freeze to death. Everybody and his brother had a way to do this makeup, so we combined techniques to come up with a pretty credible frozen corpse — blue nails on his hands, contact lenses for his frozen eyeballs, and of course, as a topper, fake icicles coming out of his mouth.”

Beneath the surface, Kirk and McCoy encounter a wide variety of alien lifeforms who are put to work mining dilithium crystals in the frozen caverns. Ed French, who designed the aliens, met first with Meyer and then prepared a series of six-inch maquettes. Jeff Kennemore and Rob Burman then sculpted full-size versions of the approved designs. Color was as important as form. “There is something tropical birdlike in these designs,” French noted, “and a touch of Japanese ceremonial

The full *Enterprise* model — built for the first *Star Trek* feature twelve years ago — was thoroughly restored and redressed by modelmaker Alan Peterson. With the exception of the suborbital shuttle seen early in the film, no new spacecraft models were created for *Star Trek VI* — a budget-driven dictate imposed by Paramount after *Star Trek V* failed to perform well at the boxoffice.

painting comes through as well. We know that *Star Trek* aliens have to be humanoid — it's tradition — but I don't think that the use of color has been exploited to its fullest before this."

One of the most colorful — literally and figuratively — is an alien prisoner who seems intent upon tearing Kirk to bits. In a nod to the original series — and to *The Outer Limits*, which provided certain references for *Star Trek* — French designed the creature with a conscious look to the past. "A number of *Outer Limits* monsters were revamped and used in *Trek*'s original pilot and during its first season. This fighter alien had thorny horns on his face; and texturally, he seemed reminiscent of certain creatures designed by Wah Chang for the old show. I had the idea that this creature might look like a living hologram, so I went to Nick and explained that I wanted to try ultraviolet light and paint on this makeup, and got his go-ahead to experiment. I talked with Michael Westmore and found that he had done some UV work with a company called Wildfire." Wildfire's fluorescent enhancements have been featured in *Bill and Ted's Bogus Journey*, and have also appeared in an episode of *Star Trek: The Next Generation* and in the upcoming *Alien 3*.

"We supplied Ed with our custom ultraviolet inks," Wildfire cofounder Richard Green recalled. "Unlike other fluorescent inks available, ours are water-thin and transparent, as well as being highly fluorescent. With opaque paints, you paint red over yellow and wind up with just red. Our inks make it possible to layer the colors over one another to blend different hues. Depending on how they are used, they can create a strong three-dimensional look — which is what Ed was looking for." For the fluorescent effect to be visible, special ultraviolet lamps were also supplied by Wildfire — lamps capable of illuminating the inks from as far away as sixty feet. "We spent twelve years developing this technology from the belief that there were a lot more possibilities for black light than just the 'Sixties' look everyone first associates it with. At this point, literally anything can be made fluorescent. It's a whole new way of illuminating a scene since you're lighting with the actual in-frame object as opposed to using a fixture throwing light which is then reflected back from the object."

Conceptually, French had problems with the fight scene. "The thing that bothered me about it was having Kirk beating this huge guy. Kirk is sixty years old! How can he possibly win? I thought that maybe this alien just likes to pick on little guys, but is in fact a really lousy fighter. So I told Rob Tharp to smash some of the horns on his face — make it look like he gets in fights all the time and loses all the time. So we screwed him up really bad on one side, as though he is still healing from his last fight. It got very exciting for all of us from that point on, and Nick just loved it — to him, the fighter looked like a semi-abstract or impressionist painting." In desperation, Kirk kicks out at his attacker, striking him in the knee — a very sensitive area on the creature. The alien collapses in agony and begins to throb colorfully with an even more pronounced fluorescent effect. "Nick came up with the idea of turning up the UV after he gets kicked, and it looks something like a Warner Brothers cartoon when Elmer Fudd's thumb gets hit by a hammer."

The design for the rest of the prison aliens was dictated by a single line in the script — 'the scum of the universe' — and the makeups were created with appliances and hair goods. Among the aliens, Kirk and McCoy encounter a strikingly beautiful Chameloid shape-changer who offers to lead them to a place on the surface from which they can be rescued. "Nick described Martia as Kirk's dream woman," French recalled, "so I made up a lot of conceptual sketches. Then Iman was hired to play the part. Nick said, 'This is the most beautiful woman in the world.' I wasn't familiar with her work,

so I went over to his office to examine her portfolio — and was I stunned! She is the most beautiful woman in the world. From that point, I knew we were not going to be doing much to alter her features. I did take a lifecast of her head; and after studying it, I found that her long neck and petite face suggested something birdlike. So I tried to develop that further. Jan Alexander and I went out and bought certain types of feathers that look a lot like hair. We did a head-piece with these feathers, and some were also glued to her face and eyebrows. Almost everything else was essentially just a glamour makeup.” Richard Snell, who had provided custom contact lenses for previous *Trek* films as well as those used on Data and Troi for *The Next Generation*, produced striking soft contact lenses that were yellow with spots inside.

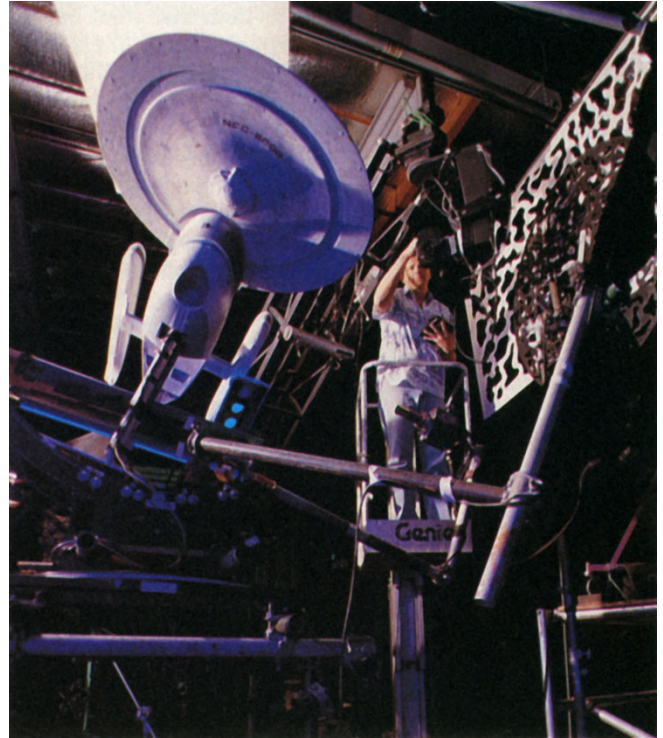


En route to prevent a second assassination at the intergalactic peace conference on Khitomer, the Enterprise comes under fire by a cloaked Bird of Prey commanded by General Chang. The Excelsior hastens to the rescue and the Klingon vessel is eventually exposed and destroyed in a deadly crossfire.



An establishing view of the peace conference site — a composite provided by Matte World — combined live-action plates shot at two different Northern California locations. The trees, bridge, water and foreground balcony were photographed in Novato while the building was shot in Brandeis. A Michael Pangrazio matte painting linked the two live-action elements and filled in the background mountains and sky while also rendering the building a bit more futuristic in appearance.

Martia's transformations — into the Brute character and a young girl — were applications of morphing technology developed by the ILM computer graphics division. "The live-action was shot on the set," Scott Farrar noted, "then combined on the computer to create the transition from one character to the next. To do that, all we had to do was scan in the film image of the actors. No intermediate steps were needed. We tried to be as creative as possible in making the transition between each character." Computer graphics animator John Berton handled the morphing shots. "There were three shots altogether," Jay Riddle noted. "The scene of the Brute changing into the little blonde girl was the first time we'd ever tried doing a camera move during a morph. We shot motion control, moving with the Brute as he leaned down toward his leg irons. Then we repeated the movement with the little girl. What made this really difficult was that the two characters were totally dissimilar in shape and size. They were shot in the actual set, so we did articulates to pull them out of the background, then morphed between them before putting the transforming figure back into the original background shot with the little girl."



Camera assistant David Hanks readies the motion control camera system for a shot of the *Excelsior*.

After escaping from the prison, Kirk and McCoy — guided by Martia in her Brute guise — brave the planet's freezing surface as they await rescue by the *Enterprise*. But Martia turns out to be part of a plot to have them permanently silenced — shot while attempting to escape. Deducing this, Kirk punches Martia, but she transforms into a Kirk duplicate — a favorite ploy from the old TV series. "Martia becomes Kirk while she is talking to him," explained Riddle. "We wanted to make the actors look good, so we were careful in changing from one to the other that we didn't end up with something grotesque or funny during the in-between section. Since there was dialogue involved, both actors were photographed saying the same thing at the same speed. But even though they were in sync, the shapes of their mouths at any given point were extremely different. On one of the important lines, *Iman* says the word 'suspicious' — and her mouth was way out in left field compared to Shatner's mouth on the same word."

Just as the commandant appears, ready to execute the escapees, Kirk and McCoy are beamed back aboard the *Enterprise*. Having determined that the principal *Enterprise* conspirator is Valeris, Spock mind-melds with the unrepentant young Vulcan to uncover the identities of the other members of the conspiracy, which involves high-ranking Federation, Klingon and Romulan officials. Kirk contacts Sulu aboard the *Excelsior* to learn the location of the upcoming peace conference, then sets off at warp speed to try to prevent a second assassination.

"Nicholas Meyer had definite opinions about what worked and what didn't on the look of the warp drive," Bill George observed, "so we took his input into account. One thing we needed to address was

that when the ships went zipping by, it was awfully hard to tell the difference between the *Enterprise* and the *Excelsior*. With the *Enterprise*, we had the standard two blue bands of light coming off the warp engines and a pink band extending back from the secondary hull — which, when viewed in perspective, gives a kind of triangular look to the effect.” For the *Excelsior*, the possibility of an entirely new warp effect was discussed. ILM had previously created a radically different effect for the *Enterprise-D* in the pilot episode of *Star Trek: The Next Generation*, and the fact that the *Excelsior* was equipped with ‘transwarp’ drive suggested a different means of propulsion. “We thought we could justify doing an entirely new warp drive for *Excelsior*, but then we realized that would be opening up a whole new can of worms. What would it look like? Why would it look that way? Since there were only two shots, we decided to go with a variation on what had already been established. So for the *Excelsior*, we went with the two blue bands on the engines alone, which, while making the warp effect a little flatter, did serve to subtly differentiate the two ships.” Animation was used to produce the warp trails, as well as serving to extend the duration of some ship shots as the vessels whip by either toward or from infinity. “We have eighty feet of track,” stated Peter Daulton, “but even at the far end of the track, using a 24mm lens, the big *Enterprise* model still winds up filling a field, or maybe half-a-field, of view. So our effects camera department starts the warp drive animation at a pinpoint, then brings it up to where it joins with our stage model at its most distant point.” This transition is shown most spectacularly as the *Enterprise*, on full impulse power, sails past camera and closes to make orbit around Khitomer — the site of the peace conference.

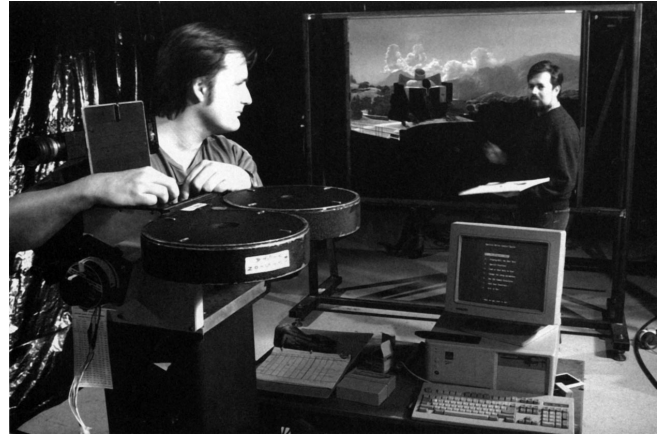
En route to Khitomer, the *Enterprise* comes under fire from a cloaked *Bird of Prey* commanded by conspirator Chang. The sequence featured a motion control move that was particularly challenging for Peter Daulton. “We started with a view looking down at the front of the *Enterprise* — a POV from the *Bird of Prey*, which is kind of playing with its victim before coming in for the kill. Then we swoop down and pass the *Enterprise*, winding up beneath the fantail looking up. To do this, we had to move the bluescreen one hundred eighty degrees in order to keep it behind the model — and with a ship that large, that became a real problem. It was a difficult shot to set up and light, and programming the move to take all this into account was the most time-consuming work in the picture for me.” Regrettably, only the middle section of the shot — as the camera circles around the side of the ship — survived into the final cut.

Like the warp drive, the look of the photon torpedo in flight had been established in previous films. Bill George, however, found it wanting. “We decided the photon torpedoes were just too pretty looking, so we did some experimentation to make them a little scarier. What we eventually settled on was a torpedo with a smaller, hotter core and a lot of flare around it.” The torpedoes also moved differently — more like guided missiles and less like cannonballs being fired. “During the battle, the *Enterprise* is really just a sitting duck. It keeps getting hit, and takes a lot of superficial damage. Then the shields go down, and it suffers serious damage. Scott Farrar came up to me during an early meeting and asked me, ‘What have you always wanted to see happen to the *Enterprise*?’ I told him there was one section of the dish that was very thin and I’d always wanted to see something burst right through it. The model shop ended up building a large-scale dish with a replacement pyro section that we shot upside down for the proper zero-g effect. So after the *Enterprise* shields go down, a photon torpedo from the *Bird of Prey* goes right up through the dish — like a shotgun blast.”

The *Excelsior* arrives on the scene; but it, too, is powerless to detect Chang's ship. Then Spock makes a rather elementary deduction about the cloaked Klingon vessel's expulsion of exhaust gases. With McCoy assisting, he readies a jerry-rigged torpedo specially modified to seek out the invisible enemy. Kirk orders the torpedo launched, and it traces a lazy path through space, weaving back and forth before homing in on the *Bird of Prey* and its startled occupants. The blast rocks the Klingon ship, destroying its cloaking capability and rendering it susceptible to counterattack by the Starfleet vessels which work in unison to destroy it with a flurry of photon torpedoes. "When the boards for this first came out, both Federation ships were about the same size in the frame and it looked a little flat — like a video game. We weren't very happy with that composition and presented a number of alternates, from which a shot — *Enterprise* in foreground, *Excelsior* in the distance, with both firing on Chang's ship in the center — was chosen."

The initial explosions were done on the motion control optical printer, with the pyro footage reduced and placed into the appropriate area of the frame. The Klingon vessel is then blown to pieces — a pyrotechnic stage effect. "We had a foam model of the *Bird of Prey* left over from *Star Trek IV*," George explained, "and we made an RTV rubber mold from that. We had to change the wing configuration, however, since the ship built for IV had the wings set flat in cruising mode for its crash-landing scene. Here the ship was in attack mode, and the wings were very low in relation to the body of the vessel. We cast three of these models in a brittle epoxy, then put some model parts inside, along with etched brass and laser-cut pieces which were supposed to represent bulkheads and interior detail." The motion control *Bird of Prey* was used for the first part of the shot, then a lap dissolve replaced it with the pyro model, which was detonated against a black backing.

The personal destruction of General Chang fell to Steve Jaffe and physical effects supervisor Terry Frazee. "We already knew what we had from ILM with the torpedo coming in," Jaffe noted, "and then there was Chang reacting to the approach. But I wasn't really satisfied with that, and I didn't think Nick would be either. After all, Chang is our nemesis and you really want to see him get it in the end. Terry and I watched the last few frames of the footage with Christopher Plummer on the set,



On stage at Matte World, matte cameraman Craig Barron prepares to photograph the Khitomer painting while artist Michael Pangrazio makes last-minute modifications to his work.



Having directed *Star Trek II* and cowritten *Star Trek IV* — considered by many to be the two best entries in the ongoing saga — Nicholas Meyer was called upon to cowrite and direct *Star Trek VI*, purportedly the last in the series to feature the original television cast. Meyer confers with cast members Leonard Nimoy and William Shatner on the *Enterprise* bridge set.

then set up a mannequin with primer cord in exactly the same position. Three cameras covered the action as we detonated the dummy. Then Ron Roose and I pored through the footage to find what amounted to three usable frames that we could use to tell the audience, 'We got him!' It's interesting that just those three frames of a dummy being blown up could provide all the punctuation the scene needed."

For an establishing view of the peace conference site on Khitomer, Matte World was again called upon. "This shot was to establish an idyllic green world," Craig Barron noted. "Most of the film was set on spaceships, so here was a chance to open things up a bit. As originally designed, the shot was to contain a tilt-down from the sky and run considerably longer, since it was part of a procession of shots leading into the peace conference. In the final cut of the movie, the action is moving much faster, so the length of the shot was trimmed down to keep pace with everything else." Painted by Michael Pangrazio, the matte shot contained two live-action elements. "The first plate was photographed in Vistavision at a community center in Brandeis, California. There was an interesting circular building used for the background with extras carrying flags and banners of the various planets. The foreground live-action plate — featuring a Starfleet officer and a Klingon standing together on a balcony — was shot latent image at the Fireman's Fund building in Novato. That plate took advantage of a circular man-made lake that shimmered in the backlit sunlight."

The background plate from Brandeis was reduced in size and rear-projected into the latent black matte of the foreground plate. Pangrazio's painting extended the balcony and served to connect the two live-action elements while adding the natural beauty of hills and trees. "These are fantasy images," Barron explained, "so to a certain degree everything has to be heightened dramatically. With the Brandeis plate, Mike put the architectural equivalent of pointed ears on the building to make it look a little more fantastic and futuristic." The shot — redesigned somewhat to take advantage of the Novato location — called for bright three-quarter backlight, but the Brandeis plate had been photographed on a hazy day, which created difficulties. "Mike's challenge was to make these two plates — shot under very different conditions — work." Additionally, the latent image plate required a hard-edged matte on the glass for the portion of the painting involving architectural structures as well as a soft-edged matte on the camera's matte box to ensure a proper blend for the section going through the trees and landscape.

Inside the Khitomer conference hall, delegates from dozens of worlds have gathered. It was here that many of Ed French's alien designs were seen — often in closeup — as were a number of Richard Snell's Vulcanoids and, of course, more Klingons. The film's *climax* involves the *Enterprise* crew's desperate attempt to thwart the planned assassination of the Federation President. "The principal actors were running through the crowd with a Steadicam following them," Michael Mills related, "so there were closeup views of all the various aliens they're shoving out of the way as they go. There was no way to cheat those makeups — they had to be totally credible." Among the aliens featured were snout-nosed Tellarites — another race culled from old TV designs. "I thought that if this really was going to be the last film, we ought to see some of those aliens one last time," French noted. "Little things like that can be important in a certain way, so I made a spot for one of them." The President's appearance was derived from an alien makeup designed by Richard Snell on *Star Trek IV*. "The hairstyle is fuller and more ornate than for the creature I did on IV, but the basic character is the same — receding hairline, forehead appliance and brilliant blue eyes."

Having saved the day and returned to their respective ships, Kirk and Sulu exchange farewells. “Since this was to be the last film,” said Bill George, “we thought the *Enterprise* and the *Excelsior* should fly off into the sunset. So during the shot, as the ships are moving away from us, we have some nice light changes as the sun actually sets and things go a little orange.” The *Enterprise* is ordered home to be decommissioned. As originally scripted, the dialogue between the principals was to be somber and Shakespearean. Ultimately, however, a more whimsical line from *Peter Pan* — first chosen for the conclusion of Meyer’s *Star Trek II*, but omitted from the final cut — was Captain Kirk’s final order before the ship sails off sunward.

Undeniably, *Star Trek VI* has evoked a kinder reception from both critics and audiences than that afforded its immediate predecessor. The series continues to endure. There are probably as many theories about *Star Trek*’s ongoing success as there are individual episodes. “Some people,” Scott Farrar observed, “just think, ‘Oh, it’s another *Star Trek*,’ but I don’t think there’s anything wrong with that — there’s nothing wrong with a *good sequel*. When my parents were young, they’d go to the movies more often than we ever do now, and they’d see these serials that would go on and on, week after week. There was a time when no one could wait until that next Zorro movie came out. The same is true for this *Enterprise* crew we’ve known for such a long time. You just want to see what kind of adventure — or misadventure — they’re going to get involved with this time. But with the number of fans out there who can predict — in advance of seeing the film — exactly what these characters will be doing, it makes it very difficult to mount a good sequel. Everyone involved has to be that much more creative in order to give these people who are so familiar with it all a new twist. And this picture does have some new twists.”

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